UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF LOUISIANA

PRESS ROBINSON., *et al.* Plaintiffs, v. KYLE ARDOIN, IN HIS OFFICIAL CAPACITY AS LOUISIANA SECRETARY OF STATE, *et al* Defendant and Intervenor-Defendants,	Case No.: 3:22-cv-00211-SDD-SDJ
AND EDWARD GALMON, SR., *et al.* Plaintiffs, v. KYLE ARDOIN, IN HIS OFFICIAL CAPACITY AS LOUISIANA SECRETARY OF STATE, *et al.* Defendant and Intervenor-Defendants,	(c/w) Case No.: 3:22-cv-00214-SDD-SDJ

INTERVENOR-DEFENDANT THE STATE OF LOUISIANA'S COMBINED OPPOSITION TO PLAINTIFFS' MOTIONS FOR PRELIMINARY INJUNCTION

Intervenor-Defendant the State of Louisiana, by and through Jeff Landry, the Attorney general of Louisiana (the "State"), files this Combined Response in Opposition to Plaintiffs' Motions for Preliminary Injunction.[1]

[1] The State will refer to Plaintiffs in the following ways: if one set of Plaintiffs only, then "*Galmon*" or "*Robinson*" Plaintiffs; together it will be "Plaintiffs." Any reference to the pre-consolidation dockets will reference the specific case name with the corresponding ECF number.

INTRODUCTION

The legislative process is a machine with many moving parts. The passage of a law is not something that happens in a few weeks. Needless to say, there is give and take from both sides of the aisle as a bill passes through various committees, both legislative chambers, and the executive branch. This elaborate political process is how the Louisiana State Legislature passed HB1, the bill that determined the boundaries for Louisiana's six congressional districts. However, despite new elections being just around the corner, Plaintiffs ask this Court to override the months-long deliberative legislative process and require that new congressional boundaries be drawn. Instead of months of bicameral hearings and careful deliberation by the elected representatives of the people, Plaintiffs want this matter to be decided by a single judge in a matter of weeks.

A rushed preliminary injunction process should not replace the deliberative legislative process. That is especially true here where the facts will show just how tenuous Plaintiffs' factual and legal arguments are. This case should play out in the same deliberative and careful process as the passage of a bill—both sides should have adequate time to prepare and be heard, and witnesses and experts should be questioned after both sides have had adequate time to prepare. If the Court rushes through a new congressional map via a preliminary injunction the primary losers will be the people of Louisiana. After all, laws are established by the will of the people. This Court should deny Plaintiffs' Motions for Preliminary Injunction and allow the legal process to play out in due course.

ARGUMENT

To obtain a preliminary injunction, Plaintiffs must show: (1) a substantial likelihood of success on the merits, (2) a substantial threat that Plaintiffs will suffer irreparable injury in the absence of an injunction, (3) that Plaintiffs' threatened injury outweighs the threatened harm to the defendant, and (4) that granting the preliminary injunction is not against the public interest. *PCI Transp. Inc. v. Fort Worth & W.R.R. Co.*, 418 F.3d 535, 545 (5th Cir. 2005). The Fifth Circuit and the Supreme Court have "cautioned repeatedly that a preliminary injunction is an extraordinary remedy which should not be granted unless the party seeking it has 'clearly carried the burden of persuasion' on all four requirements." *Id.* (quoting *Lake Charles Diesel, Inc. v. General Motors Corp.*, 328 F.3d 192, 195 (5th Cir. 2003)); *Nken v. Holder*, 556 U.S. 418, 428 (2009) (calling an injunction an "extraordinary remedy." (quoting *Weinberger v. Romero-Barcelo*, 456 U.S. 305, 312 (1982)). Plaintiffs have failed to carry their burden of meeting "all four requirements" for a preliminary injunction here. *Id.*

Further, it must be noted that "the purpose of [a preliminary injunction] is *not* to conclusively determine the rights of the parties." *Trump v. Int'l Refugee Assistance Project*, 137 S. Ct. 2080, 2087 (2017). What's more, "mandatory injunctive relief, which goes well beyond simply maintaining the status quo *pendente lite*, is particularly disfavored, and should not be issued unless the facts and the law *clearly* favor the moving party." *Martinez v. Mathews*, 544 F.2d 1233, 1243 (5th Cir. 1976); *see also Miami Beach Fed. Sav. & Loan Assoc. v. Callander*, 256 F.2d 410, 415 (5th

Cir. 1958) ("A mandatory injunction, especially at the preliminary stage of proceedings, should not be granted except in rare instances in which the facts and law are clearly in favor of the moving party."); *Justin Industries, Inc. v. Choctaw Secur., L.P.,* 920 F.2d 262, 268 (5th Cir. 1990) (per curiam) (The party "seeking a mandatory injunction . . . bears the burden of showing *clear entitlement* to the relief under the facts and the law." (emphasis added)).

I. Plaintiffs Are Unlikely Succeed on the Merits of their Voting Rights Act Claims.

Louisiana is vested with the authority, under the Elections Clause, to determine the "Times, Places and Manner of holding Elections for . . . Representatives." U.S. Const. art. I, § 4, cl. 1. To that end, "reapportionment is primarily a matter for legislative consideration and determination." *White v. Weiser*, 412 U.S. 783, 794 (1973). In order to be successful on the merits of their Voting Rights Act claims, Plaintiffs must establish that the "political process leading to the nomination or election in" Louisiana is "not equally open to participation by members" of a minority group "on account of race." 52 U.S.C. § 10301(a) and (b). To that end, under the current understanding of claims under Section 2, Plaintiffs must meet the standard announced by *Thornburg v. Gingles* and its progeny.[2] 478 U.S. 30 (1986). The U.S. Supreme Court has signaled, however, that it will be reviewing vote dilution claims under Section 2 and the *Gingles* standard in the coming term in. *See*

[2] In the next term, the Supreme Court will hear a case on vote dilution claims under the Voting Rights Act. *Merrill, et al. v. Milligan, et al.*, No. 21-1086 (Mar. 21, 2022) (granting motion to amend the question presented to "Whether the State of Alabama's 2021 redistricting plan for its seven seats in the United States House of Representatives violated section 2 of the Voting Rights Act, 52 U. S. C. §10301.").

Merrill v. Milligan, 142 S. Ct. 879 (Feb. 7, 2022) (granting stay of a find of vote dilution under Section 2 and treating stay motion as a jurisdictional statement); *Merrill, et al. v. Milligan, et al.*, No. 21-1086 (2022) (consolidated with *Merrill, et al. v. Caster*, *et al.*, No. 21-1087 (2022)).

Assuming for now that *Gingles* controls, it requires that each of the following three preconditions to be met for any claim of vote dilution in districting to succeed: (1) "the minority group must be able to demonstrate that it is sufficiently large and geographically compact to constitute a majority in a single-member district"; (2) "the minority group must be able to show that it is politically cohesive"; and (3) "the minority must be able to demonstrate that the white majority votes sufficiently as a bloc to enable it . . . usually to defeat the minority's preferred candidate." *Gingles*, 478 U.S. at 50-51. Failure to establish all three of the *Gingles* preconditions dooms a claim under Section 2. *Clark v. Calhoun County*, 21 F.3d 92, 94 (5th Cir. 1994). Once each of the three preconditions are met, Plaintiffs must then show, "under the totality of the circumstances," they do not possess the same opportunities to participate in the political process and elect representatives of their choice" as set forth in the so-called senate factors that accompanied the passage of Section 2. *League of United Latin Am. Citizens, Council No. 4434 v. Clements*, 999 F.2d 831, 849 (5th Cir. 1993) (hereinafter *LULAC, Council*); *see also id.* at 849 n.22 (listing the senate factors).

Plaintiffs here cannot meet at least two of the three preconditions, or, at the very least, they are not "substantially likely" to succeed on the merits of their claims

as to the first and third *Gingles* preconditions. As such, the Court should not grant a preliminary injunction.

A. No sufficiently numerous and geographically compact second majority-minority district can be drawn in Louisiana.

In order to prevail on their argument that a second majority-Black congressional district is required under Section 2 of the VRA, under the first *Gingles* precondition, Plaintiffs must show that it is possible to "creat[e] more than the existing number of reasonably compact districts with a sufficiently large minority population to elect candidates of its choice." *LULAC v. Perry*, 548 U.S. 399, 430 (2006) (plurality opinion). Under *Bartlett v. Strickland*, the districts must contain a majority of minority citizens of voting age population. 556 U.S. 1, 19-20 (2009). Here, despite Plaintiffs' emphatic statements to the contrary, Plaintiffs do not meet the required burden under a reasonable understanding of census race categories.

Through statistical manipulation, Plaintiffs' experts claim their illustrative plans showing two majority-minority congressional districts with Black voting age populations over ("BVAP") 50%, appear to have met the + 50% BVAP burden. In these illustrative plans, their proposed districts are over 50% BVAP by a razor's edge. *Robinson* Plaintiffs' expert BVAP percentages are as follows: 50.16%, 50.04%, 50.65%, 50.04%, 50.16%, and 51.63%. ECF No. 43 at 24-48. *Galmon* Plaintiffs' expert BVAP percentages are 50.96% and 52.05%. ECF No. 41-2 at 23. Plaintiffs' experts

state that they used "Any Part Black" to define the term "Black". ECF No. 43 at 6; and ECF No. 41-2 at 11.[3]

Why would Plaintiffs' experts use "Any Part Black" when forming their illustrative maps as opposed to "DOJ Black"? The answer is simple: if they used the "DOJ Black" then the BVAP numbers do not rise above 50%, which is required to justify the creation of two majority-minority congressional districts. For example, when looking at the three Cooper illustrative maps and using "DOJ Black" as the racial metric, the BVAP percentages are as follows: 48.41%, 49.22%, 48.92%, 49.25%, 48.41%, and 50.81%. Expert Report of Thomas Bryan (attached hereto as "Exhibit A") at 19-21. The only "DOJ Black" BVAP number above 50% was in CD5 in "Illustrative 3" at 50.81% where the "DOJ Black" BVAP in CD2 was at 48.41%—well below any required metric and proving that drawing two legally sufficient "DOJ Black" BVAP districts is not possible. *Id.* The *Galmon's* illustrative map possesses the same insufficiencies as *Robinson's* "Illustrative 3" map with "DOJ Black" percentages at 49.39% and 51.25%—again, showing that you cannot create two legally sufficient BVAP congressional districts. *Id.* at 19.[4]

[3] "Any Part Black" is a broader census category that includes anyone that is "Black", as well as "Black" combined with any other race. "DOJ Black" is a narrower the category that includes those who are "Black" and those who are "Black and White". *See Pope v. Cty. of Albany*, No., 2014 U.S. Dist. LEXIS 10023, at *7-8 n.3 (N.D.N.Y. 2014). As Tom Bryan notes in his report, "any part" Black may include a person who had one Black grandparent. Or this may include a citizen who is Black and Hispanic and whose family might have immigrated from Haiti, and whose family may speak French at home. *See* Ex. A at ¶¶ 21-26.

[4] While using "Any Part Black" to define "Black", Plaintiffs fail to use the analogous racially expansive category to define "White". Therefore, if someone were to identify as Black and Hispanic, they would be included in Plaintiffs' "Black" number, but if someone were to identify as White and Hispanic, they would not be included in Plaintiffs' "White" number. *See* ECF No. 41-2 at 29.

To get to even those bare minimum totals, Plaintiffs had to ignore any conception of communities of interest. "All four plans are based on the presumption that African American Louisiana residents all share the same interest because of their race, regardless of where they geographically reside." Expert Report of Michael Hefner at 14 (attached hereto as "Exhibit C"). While the enacted HB1 plan generally keeps communities of interest intact, "the Plaintiffs' plans do not." Ex. C at 22. "The fact that so many communities of interest were either divided among the Congressional districts or paired with unlikely and dissimilar larger cities begs the question of whether the distribution of African Americans are truly compact enough to create a second majority-minority Congressional district." *Id.*

Though not lawyers, Plaintiffs' experts cite to a dicta footnote in *Georgia v. Ashcroft*, 539 U.S. 461 (2003), as justification for their use of "Any Part Black" as opposed to "DOJ Black". *See* ECF No. 41-2 at 11; ECF No. 43 at 6. However, a proper understanding of context surrounding *Georgia v. Ashcroft* will show that Plaintiffs' non-lawyer experts' opinions are misguided. In 2003, when *Georgia v. Ashcroft* was decided, the Secretary of State for Georgia did not have a race category that corresponded with "DOJ Black" when classifying race for the purposes of map drawing. *See Georgia*, 539 U.S. at 473 n.1. As such, when drawing proposed maps, Georgia was permitted to use "Any Part Black" because it corresponded better with the racial definitions in Georgia's voter data. *Id.* The fact the United States Supreme Court felt it needed to add a footnote to explain why it was allowing the use of "Any Part Black" as opposed to "DOJ Black" only shows how big of an exception this was.

With Louisiana, the *Georgia v. Ashcroft* exception is not applicable because Louisiana, when voluntarily providing race information, only allows voters to register as White, Black, Asian, Hispanic, American Indian, or Other.[5] *See* La. R.S. 18:104(B) (providing race information is optional). Long story short: because Georgia used racial categories that were similar to "Any Part Black" when drawing the maps at issue in *Georgia v. Ashcroft*, it made sense to use a similar racial metric when comparing proposed maps—however, this distinction does not create a reason to stray from "DOJ Black" in Louisiana. The dicta footnote in *Georgia v. Ashcroft* does not call for a *one size fits all* approach, but allows for the use of racial classifications that correspond most directly with the racial data linked to voter files in a particular state.

Often, courts have examined the question of whether a map drawer should use "DOJ Black" or "Any Part Black" contain +50% BVAP under either measure, meaning it was unnecessary for the court to make a legal determination to that regard. *See Pope v. Cty. of Albany*, 687 F.3d 565, 577 n.11 (2d Cir. 2012) ("Because plaintiffs satisfy the first *Gingles* factor for DOJ Non-Hispanic Blacks, we need not here consider whether the relevant minority group might more appropriately be identified as "Any Part Black," for which the minority VAP percentages are even higher."). However, here, the specific mix of census responses used to meet the *Bartlett* numerosity test matters because Plaintiffs are struggling to draw a second district that meets the numerosity requirements under either measure, and certainly under

[5] *See* Application to Register to Vote, *available at* https://www.sos.la.gov/ElectionsAndVoting/PublishedDocuments/ApplicationToRegisterToVote.pdf (last visited April 29, 2022).

"DOJ Black" numbers. As a result, this Court must resolve the difficult question of "who counts as black" for the purposes of Section 2 analysis. Where this court draws the demographic lines or definitions is a crucial step in determining whether Plaintiffs have any case at all—let alone one that would allow them to prevail at the preliminary injunction stage.

Additionally, as we are currently at the preliminary injunction stage, Plaintiffs must show that there is a "substantial likelihood of success on the merits" of their claims. *Speaks v. Kruse*, 445 F.3d 396, 399-400 (5th Cir. 2006). The fact that Plaintiffs' only arguable path to victory in this matter comes from the statistical manipulation of racial data shows the absurdity of this exercise. This Court should not permit a rushed analysis and map drawing process to trump the detailed legislative process that that led to the enactment of the challenged maps. After all, legislative enactments are presumed to be in good faith. *Abbott v. Perez*, 138 S. Ct. 2305, 2325 (2018).

Finally, while Plaintiffs do not directly make the claim that they are entitled to a proportional number of Black candidates elected in numbers equal to their population, both Plaintiffs, in their complaints and in their preliminary injunction motions, highlight the discrepancy in the number of elected Black candidates in proportion to the Black population in Louisiana. *See, e.g, Robinson*, ECF No. 1 at ¶ 1; *see Galmon,* ECF No. 1, at ¶ 2; *see* ECF No. 41-1 at 4; *see* ECF No. 42-1 at 2-3. However, it is well established that when a plaintiff brings a claim under Section 2, there is "nothing in [Section 2 that] establishes a right to have members of a protected

class elected in numbers equal to their proportion in the population." 52 U.S.C. § 10301(b); *Thornburg v. Gingles*, 478 U.S. 30, 43 (1986) ("[I]n evaluating an alleged violation, § 2(b) cautions that 'nothing in [§ 2] establishes a right to have members of a protected class elected in numbers equal to their proportion in the population.'"). As such, Plaintiffs' excessive reliance on these facts is misguided.

B. The minority population in Louisiana is not compact.

In their motions for preliminary injunction, both sets of Plaintiffs only bring claims under Section 2 of the VRA. ECF No. 41 at 2; ECF No. 42 at 2. In addition to showing that the allegedly injured racial group is "sufficiently large," Plaintiffs must also show that the minority group is "geographically compact." *Thornburg v. Gingles*, 478 U.S. 30, 50-51 (1986). A compactness analysis under Section 2 is different than that of an equal protection claim. *League of United Latin Am. Citizens v. Perry*, 548 U.S. 399, 433 (2006) (hereinafter *LULAC v. Perry*). "In the equal protection context, compactness focuses on the contours of district lines to determine whether race was the predominant factor in drawing those lines." *Id.* (citing *Miller v. Johnson*, 515 U.S. 900, 916-917 (1995)). However, "[u]nder § 2, by contrast, the injury is vote dilution, so the compactness inquiry embraces different considerations. 'The first *Gingles* condition refers to the compactness of the minority population, not to the compactness of the contested district.'" *Id.* (citing *Bush v. Vera*, 517 U.S. 952, 997 (1996) (Kennedy, J., concurring); *Abrams v. Johnson*, 521 U.S. 74, 111 (1997) (Breyer, J., dissenting)).

"While no precise rule has emerged governing § 2 compactness, the inquiry should take into account traditional districting principles such as maintaining

communities of interest and traditional boundaries." *Id.* (cleaned up). For example, a district that "reaches out to grab small and apparently isolated minority communities" is not reasonably compact. *Id.* (quoting *Vera*, 517 U.S. at 979). "[T]here is no basis to believe a district that combines two far-flung segments of a racial group with disparate interests provides the opportunity that § 2 requires or that the first *Gingles* condition contemplates." *Id.* Plaintiffs' plans do just that. Ex. C at 14, 22-23.

Here, Plaintiffs districts are not compact as they do exactly what the Supreme Court prohibited in *LULAC v. Perry*—combining "far-flung segments of a racial group" in hopes to create a second majority minority district. 548 U.S. at 433. Louisiana's spatial analytics expert, Dr. Murray, specifically shows just how non-compact Blacks are in Plaintiffs' illustrative maps. Below is the milage chart created by Dr. Murray that shows the distance between the center of the Black populations in communities across Louisiana:

	Alexandria	Baton Rouge	New Orleans	Lafayette	Monroe	Shreveport
Alexandria	0	98	169	77	86	112
Baton Rouge	98	0	72	56	152	209
New Orleans	169	72	0	119	211	279
Lafayette	77	56	119	0	157	186
Monroe	86	152	211	157	0	99
Shreveport	112	209	279	186	99	0

Every map proposed by Plaintiffs combines Monroe's Black population with the Black population of Baton Rouge and Lafayette—despite the populations being 152 and 157 miles apart, respectively. Expert Report of Dr. Alan Murray (attached hereto as "Exhibit B") at 24. To combine Black communities from far-flung parts of Louisiana in the same district is to discount the different experiences and make-up of those communities—such as countries of origin and primary languages spoken. *See*

Ex. C at 7-23. And, in so doing, "do a disservice" to these diverse minority populations "by failing to account for the differences between people of the same race." *LULAC v. Perry*, 548 U.S. at 434. For this reason, along with many others, Plaintiffs' arguments must fail.

C. Plaintiffs' proposed exemplar maps show that no constitutional second majority-minority congressional district is possible in Louisiana.

"A federal judge cannot command what the Constitution condemns." *Thomas v. Bryant*, 938 F. 3d 134, 184 (5th Cir. 2019) (Willet, J. dissenting). The Equal Protection Clause of the Fourteenth Amendment's "central mandate is racial neutrality in governmental decisionmaking," including "a State's drawing of congressional districts." *Miller v. Johnson*, 515 U.S. 900, 904-05 (1995). This is true even when the purported purpose of the racial gerrymander is in seeking to comply with the dictates of the Voting Rights Act. "Racial gerrymandering, even for remedial purposes, may balkanize us into competing racial factions; it threatens to carry us further from the goal of a political system in which race no longer matters—a goal that the Fourteenth and Fifteenth Amendments embody, and to which the Nation continues to aspire." *Shaw v. Reno*, 509 U.S. 630, 657 (1993) (cleaned up). To put it even more simply, "[t]he way to stop discrimination on the basis of race is to stop discriminating on the basis of race." *C.f. Parents Involved in Cmty. Sch. v. Seattle Sch. Dist. No. 1*, 551 U.S. 701 (2007). Because Plaintiffs' exemplar maps are racial gerrymanders of the type that would make the authors of the infamous *Gomillion v. Lightfoot* plan blush, their motion for preliminary injunction should be denied.

Compare Gomillion v. Lightfoot, 364 U.S. 339, 348 app. 1 (1960) *with E.g.,* Ex. A at 82-101 (showing how Plaintiffs' maps carefully included as much urban Black voting age population in their districts as possible while avoiding urban majority white populations).

Initially, it is acknowledged that the Supreme Court has long "assumed" that the Voting Rights Act is "a compelling interest" sufficient to satisfy strict scrutiny. *Cooper v. Harris*, 137 S. Ct. 1455, 1469 (2017). That "assumption" cannot give Plaintiffs and the courts license to seek out every Black majority census block it can find in order to cobble together a *bare* majority for *Gingles* purposes. The relevant test for a racial gerrymander is that there first must be proof "that 'race was the predominant factor motivating the legislature's decision to place a significant number of voters within or without a particular district[6] [and then] *[s]econd*, if racial considerations predominated over others, the design of the district must withstand strict scrutiny."[7] *Cooper*, 137 S. Ct. at 1463-64.

Here, Plaintiffs' illustrative maps go block by block through towns and cities as diverse as Monroe, Lafayette, and Baton Rouge, attempting to pick out only those census blocks over 50% population and excluding to the extent possible blocks of less than 50% Black population. *E.g.*, Ex. A at ¶¶ 40-44 (analyzing the splits of Lafayette in the illustrative plans and showing how race was distributed unequally among the

[6] Proof of predominance is found by demonstrating that traditional districting factors were subordinated to "racial considerations." *Cooper*, 137 S. Ct. at 1463-64.

[7] The test for racial gerrymandering claims in *Cooper* presumes that plaintiffs are seeking to prove the government acted with racial motivations. However, the test is just as valuable in determining *plaintiffs'* motives for drawing a racial gerrymander for illustrative purposes.

splits). This is the exact type of evidence of racial intent that dooms legislative action. *Bethune-Hill v. Va. State Bd. Of Elections*, 137 S. Ct. 788, 799 (2017) (noting that a finding of racial predominance is usually accompanied by a showing the traditional redistricting criteria were subordinated to race based considerations). This Court cannot condone this overt use of race simply because it is under the guise of a mere "illustrative map." More to the point, if it is impossible for Plaintiffs to demonstrate that a second majority-minority district can be drawn without impermissibly resorting to mere race as a factor, as Plaintiffs did here, then Plaintiffs have not carried their burden "of showing *clear entitlement* to the relief under the facts and the law." *Justin Industries, Inc. v. Choctaw Secur., L.P.*, 920 F.2d 262, 268 (5th Cir. 1990) (per curiam) (emphasis added).

The Fifth Circuit's holding in *Clark v. Calhoun County* does not necessitate a different result. In *Clark* the Fifth Circuit found after a trial on the merits that the Supreme Court's holding in *Miller v. Johnson* does not limit the scope of the first *Gingles* precondition. *Clark v. Calhoun County*, 88 F.3d 1393, 1406 (5th Cir. 1996). The posture of this case is demonstrably different as this case is in the preliminary injunction stage of the proceedings. The issue with Plaintiffs' proposed illustrative maps is that they cannot demonstrate to the Court that a remedy is even possible, let alone make the required showing of a clear entitlement to relief. Put another way, if the only relief that can be afforded Plaintiffs is itself unconstitutional, there can be no relief at all. Therefore, Plaintiffs' request for a preliminary injunction should be denied.

D. Politics, not race, is responsible for Louisiana's voting patterns.

When "partisan affiliation, not race, best explains the divergent voting patterns among minority and white citizens" in the relevant jurisdiction then there is no "legally significant" racially polarized voting under the third *Gingles* precondition. *LULAC, Council*, 999 F.2d at 850. "'The Voting Rights Act does not guarantee that nominees of the Democratic Party will be elected, even if black voters are likely to favor that party's candidates.' Rather, § 2 is implicated only where Democrats lose *because they are black*, not where blacks lose because they are Democrats." *Id.* at 854 (emphasis added) (quoting *Baird v. Consolidated City of Indianapolis*, 976 F.2d 357, 361 (7th Cir. 1992). This tracks closely to the text of the Voting Rights Act, as amended, that requires that "[n]o voting qualification or prerequisite to voting or standard, practice, or procedure shall be imposed or applied by any State . . . in a manner which results in a denial or abridgement of the right of any citizen of the United States to vote on account of race or color." 52 U.S.C. § 10301(a). Therefore "evidence that divergent voting patterns are attributable to partisan affiliation or perceived interests rather than race [is] quite probative" to the question of racial bloc voting.[8] *LULAC, Council*, 999 F.2d at 858 n.26.

[8] There is significant disagreement within this Circuit on the burdens imposed by this evidentiary question. *Compare LULAC, Council*, 999 F.2d at 859-861 (noting that there is "a powerful argument supporting a rule that plaintiffs, to establish legally significant racial bloc voting, must prove that their failure to elect representatives of their choice cannot be characterized as a 'mere euphemism for political defeat at the polls,' or the 'result' of 'partisan politics.'") (citations omitted) *with Teague v. Attala County*, 92 F.3d 283, 290 (5th Cir. 1996) (holding that defendants may rebut evidence of racial bloc voting) *and Lopez v. Abbott*, 339 F. Supp. 3d 589, 604 (S.D. Tex. 2018) (holding that "Plaintiffs have the duty, in the first instance, to demonstrate some evidence of racial bias through the factors used in the preconditions and the totality of the circumstances test. Upon doing so, the burden shifts

Here it is clear that it is *politics and not race* which is the determining factor in the electoral chances of Black Louisianans. Or, at the very least, the facts with respect to racial bloc voting do not "clearly favor" Plaintiffs. *See Martinez v. Mathews*, 544 F.2d 1233, 1243 (5th Cir. 1976). Dr. Alford, professor of political science from Rice University, conducted an analysis of the reports submitted by Plaintiffs' experts Drs. Handley and Palmer. Dr. Alford found that while "voting may be correlated with race . . . the differential response of voters of different races to the race of the candidate is not the cause." Expert Report of Dr. Alford at 9 (attached hereto as Exhibit D). Instead, he found that the polarization seen in the data is a result of Democratic party allegiance and not race. *Id.* at 6, 8.

To come to this conclusion, Dr. Alford replicated the Ecological Inference ("EI") analysis done by Drs. Handley and Palmer to assess any quantitative differences in the data. *Id*. at 2. Dr. Alford observed that there were only slight variations that are expected when conducting these sorts of analysis. *Id*. at 2. As the numbers he achieved were similar, and thus do not impact his expert opinions, he relied on the EI estimates that Drs. Hanley and Palmer produced. *Id*. at 3.

First, Dr. Alford analyzed the Presidential election results and found that political polarization and not politics is the likely cause of Black and white voting trends. *Id*. at 3-5. Unlike the conclusions of Drs. Hanley and Palmer, the three presidential elections analyzed show that support amongst Black voters does not track with the race of the candidate, but rather the *party* of the candidate. *Id*. at Table

to the State to demonstrate some evidence of partisan politics (or some other issue) influencing voting patterns.").

1 p. 3. Dr. Alford analyzed the 2012, 2016, and 2020 presidential elections. These three elections are interesting because the 2012 election had a Black Democrat (President Obama) against a white republican (Mitt Romney) who both had white Vice-Presidential running mates (then-Vice-President Biden and Paul Ryan). *Id.* at 5. The 2016 election had two all-white tickets—Hillary Clinton and Tim Kaine (D) and President Trump and Vice President Pence (R). *Id.* The 2018 election pitted two white presidential candidates—President Biden (D) and President Trump (R)—against each other but the Vice-Presidential candidates were a Black candidate in Vice President Harris against white candidate Vice President Pence. *Id*. If race were the driving factor, one would expect that voters would vote in a pattern with President Obama securing the highest Black support and the lowest white support with Clinton earning the lowest Black support and highest white support, with President Biden joined by Vice President Harris in the middle. *Id*. What actually happened is that the all-white Clinton/Kaine campaign received the most support amongst Black voters and the least support amongst white voters. *Id*.

Turning now to contests in which there were no Democratic candidates, the data shows that any "pattern of racial differences in voting largely disappears." *Id*. at 6. There are three recent Louisiana elections in which two Republican candidates went head-to-head: (1) Attorney General in 2015; (2) State Treasurer in 2015; and (3) Commissioner of Insurance in 2019. *Id*. In these contests, Black and white support for the candidates is nearly identical in the 2015 and 2019 Treasurer and Commissioner of Insurance elections. *Id*. The one minor outlier is the election for

Attorney General in 2015. However, this election only serves to reinforce the point that politics, not race, is the primary motivator of racial differences in voting. In 2015, Republican General Landry ran against General Caldwell. What distinguishes the modest differences in this race is the fact that Caldwell was first elected to office as a Democrat, only changing his party affiliation in 2011. *Id*. Other statewide elections reinforce the broader point that:

> Black voters' [tendency] to vote at high levels for Democratic candidates is not dependent on those Democratic candidates themselves being Black or white, only that they are Democrats. Similarly, the tendency of white voters to vote at low levels for Democratic candidates is not dependent on those Democratic candidates themselves being Black or white, only that they are Democrats.

Id. at 8. Therefore, it is clear that while "voting may be correlated with race . . . the differential response of voters of different races to the race of the candidate is not the cause." *Id*. at 9. As such, Plaintiffs have not shown there is "legally significant" bloc voting, *see LULAC, Council*, 999 F.2d at 850, and, consequently, they are not entitled to the "extraordinary remedy" of a preliminary injunction. *See PCI Transp. Inc.*, 418 F.3d at 545.

E. There is no private right of action under Section 2 of the Voting Rights Act.

This Court should dismiss Plaintiffs claims because there is no private right of action under Section 2 of the Voting Rights Act. Never has the Supreme Court held that a private cause of action exists under Section 2 of the Voting Rights Act, and recently two members of the Court "flag[ged]" the issue for future litigation. *Brnovich v. Democratic Nat'l Comm.*, 141 S. Ct. 2321, 2350 (2021) (Gorsuch, J., concurring)

("Our cases have assumed—without deciding—that the Voting Rights Act of 1965 furnishes an implied cause of action under §2. . . . this Court need not and does not address that issue today."). The Fifth Circuit has even recently acknowledged that it is an open question as to whether a private right of action exists under Section 2 of the Voting Rights Act. *Thomas v. Reeves*, 961 F.3d 800, 808 (2020) (Costa, J. concurring); *see also id.* at 818 (Willett, J. concurring). That said, the Eastern District of Arkansas has recently held that "[i]t is undisputed that Congress did not include in the text of the Voting Rights Act a private right of action to enforce Section 2." *Arkansas State Conference of the NAACP v. Arkansas Board of Apportionment*, 2022 U.S. Dist. LEXIS 29037, *21 (E.D. Ark Feb. 17, 2022).

To determine if an implied right of action exists, a court must first assess whether the statute demonstrates "a congressional intent to create new rights;" and, if so, the court must then determine whether the statute "manifest[s] an intent to create a private remedy[.]" *Alexander v. Sandoval*, 532 U.S. 275, 288-89 (2001). Like many things involving a statute, courts must look at "the text and structure of" the statute when making its determination. *Id.* Any alternative sources of congressional intent are irrelevant. *Id.* It is apparent when looking at the face of Section 2, both in isolation and in the context of the Voting Rights Act as a whole, that it fails the test articulated in *Sandoval*.

Section 12 of the Voting Rights Act is the only section of the statute that provides a remedy for Section 2. However, that provision only identifies the Attorney General of the United States as the party who can enforce the statute. 52 U.S.C. §

10308(d). Section 12(d) provides that *the Attorney General* may institute proceedings on behalf of the United States "[w]henever any person has engaged or there are reasonable grounds to believe that any person is about to engage in any act or practice prohibited by" Section 2 of the VRA. 52 U.S.C. § 10308(d). As *only* the Attorney General is identified as the individual who may enforce Section 2, Plaintiffs here have no right to step into his shoes. As such, Plaintiffs lack a private cause of action under Section 2.

II. The threatened injury to the State as well as the Public Interest Weigh in Favor of *Not* Granting Plaintiffs' Requested Relief.

The Fifth Circuit's analysis with respect to whether an injunction is in the public interest "begins with the staunch admonition that a federal court should jealously guard and sparingly use its awesome powers to ignore or brush aside long-standing state constitutional provisions, statutes, and practices." *Chisom v. Roemer*, 853 F.2d 1186, 1189 (5th Cir. 1988). When analyzing the public interest, the courts should also consider the proximity of forthcoming elections. *See id.*

A. The Supreme Court's holding in *Purcell* dictates that preliminary relief be denied.

"A State indisputably has a compelling interest in preserving the integrity of its election process." *Purcell v. Gonzalez*, 549 U.S. 1, 4 (2006) (per curiam) (quoting *Eu v. San Francisco County Democratic Central Comm.,* 489 U.S. 214, 231 (1989)). "Court orders affecting elections . . . can themselves result in voter confusion and consequent incentive to remain away from the polls." *Purcell*, 549 U.S. at 4-5. These concerns are heightened "in the apportionment context" where "'a court is entitled to

and *should* consider the proximity of a forthcoming election and the mechanics and complexities of state election laws'" when determining whether to "'award or withhold immediate relief.'" *Veasey v. Perry*, 769 F.3d 890, 893 (5th Cir. 2014) (quoting *Reynolds v. Sims*, 377 U.S. 533, 585 (1964)). Injunctions close in time to elections are thus disfavored in federal court. *Purcell*, 549 U.S. at 4-6.

Here there are looming candidate deadlines that must be met.[9] As Justice Kavanaugh recently explained concurring in a stay of a similar case out of Alabama "state and local election officials need substantial time to plan for elections. Running elections state-wide is extraordinarily complicated and difficult. Those elections require enormous advance preparations by state and local officials, and pose significant logistical challenges." *Merrill v. Milligan*, 142 S. Ct. 879, 879 (2022) (Kavanaugh, J., concurring). A similar issue is present here. The State through its executive officers, such as the Secretary of State, are currently in the process of implementing the existing districts. Any hinderance or reversal of that work will result, at minimum, in the requisite risk of confusion sufficient to trigger *Purcell*. This is because "[c]hanges that require complex or disruptive implementation must be ordered earlier than changes that are easy to implement." *Id.* Implementation of new redistricting maps are among the most disruptive changes a court can order, not just because of the complexities involved, but also the downstream effects that it can have on numerous aspects of state election administration and the electoral system

[9] *See* Louisiana Secretary of State, "2022 Elections," available at https://www.sos.la.gov/ElectionsAndVoting/PublishedDocuments/ElectionsCalendar2022.pdf (last visited April 6, 2022).

overall. Indeed, "[s]hifting district and precinct lines can leave candidates wondering, voters confused, and election officials with a tremendous burden to implement maps in a timely manner with very limited resources." *Perez v. Texas*, 970 F. Supp. 2d 593, 606 (W.D. Tex. 2013).

Therefore, under Purcell immediate injunctive relief should be denied irrespective of the underlying merits of Plaintiffs' claims. *Veasey v. Perry*, 769 F.3d 890, 893 (5th Cir. 2014) (holding that relief can be denied under *Purcell* even if an "'apportionment scheme was found to be invalid'") (quoting *Reynolds v. Sims*, 377 U.S. 533, 585 (1964)).

B. The accelerated scheduling order denies the people of Louisiana an adequate defense.[10]

The State of Louisiana respectfully objects—in the most strenuous terms—to this Court's preliminary injunction schedule in theses consolidated matters. While the State's motions to intervene were pending in the now consolidated matters, the Court implemented a schedule that works a material injustice on the State and, thereby, the people of Louisiana.[11] The actions of this Court are prejudicial to the defense and, as such, are prejudicial to both Defendants and the public interest.

While the extent of the prejudice, and the attendant evidence of that prejudice, must wait for the State's forthcoming motion, it is sufficient to note here that it cannot

[10] Thus, the State of Louisiana will be filing an emergency motion to stay these proceedings and a motion to reset deadlines so that a proper and robust defense to Plaintiffs' claims can be mounted.

[11] This objection is notwithstanding the fact that the current schedule is less catastrophic than the previous one. On April 13th the Court implemented a schedule that gave Defendants (which did not yet include either of the Intervenors) a mere four days—*over the Easter weekend*—to respond. *See Robinson* (ECF No. 33). The mere fact that the Court granted Defendants two weeks to respond to briefing and expert reports, *see Robinson* (ECF No. 35), that Plaintiffs had *months* to draft and prepare is no better than a band-aid on a broken leg.

be in the public interest to disallow a robust defense of a law where "the good faith of the legislature is presumed." *Abbott v. Perez*, 138 S. Ct. 2305, 2324 (2018). A motion prior to the State filing its response was impossible as both the counsel and the experts necessarily had to devote all their attention to responding to the preliminary injunction motions. As will be fully detailed in the future motion, the following are just some of the issues that are prejudicial to the Defendants because of the current schedule: (1) Defendants' experts had insufficient time to fully analyze and respond to Plaintiffs' experts; (2) there was insufficient time to retrieve and review documents and other factual information residing within the State's agencies; and (3) certain fact witnesses have had limited availability. The State looks forward to providing evidence as to why a new schedule should issue,[12] but for now it ought to be sufficient to say that a rushed proceeding does nothing but harm the public.

CONCLUSION

For the aforementioned reasons, the Court should deny Plaintiffs' motion for preliminary injunction.

Dated: April 29, 2022,

Respectfully Submitted,

Jeff Landry
Louisiana Attorney General

/s/ Angelique Duhon Freel
Elizabeth B. Murrill (LSBA No. 20685)
Shae McPhee (LSBA No. 38565)
Morgan Brungard (CO Bar No. 50265)**
Angelique Duhon Freel (LSBA No. 28561)
Carey Tom Jones (LSBA No. 07474)

Jason B. Torchinsky (DC 976033)*
Phillip M. Gordon (DC 1531277)*
Dallin B. Holt (VSB 97330)*
Holtzman Vogel Baran
Torchinsky & Josefiak, PLLC

[12] "[A] party arguing that time limits are unfair must show prejudice." *Laster v. District of Columbia*, 499 F. Supp. 2d 93, 100-01 (D.D.C. 2006).

15405 John Marshall Highway
Haymarket, VA 20169
(540) 341-8808 phone
(540) 341-8809 fax
jtorchinsky@holtzmanvogel.com
pgordon@holtzmanvogel.com
dholt@holtzmanvogel.com

*admitted *pro hac vice*
** admission *pro hac vice* forthcoming

Jeffery M. Wale (LSBA No. 36070)
Office of the Attorney General
Louisiana Department of Justice
1885 N. Third St.
Baton Rouge, LA 70804
(225) 326-6000 phone
(225) 326-6098 fax
murrille@ag.louisiana.gov
freela@ag.louisiana.gov
walej@ag.louisiana.gov
jonescar@ag.louisiana.gov
mcphees@ag.louisiana.gov
brungardm@ag.louisiana.gov

Counsel for Intervenor-Defendant the State of Louisiana

CERTIFICATE OF SERVICE

I CERTIFY I have served the foregoing was served on counsel for the parties via electronic means on April 29, 2022.

/s/ Jason Torchinsky
Jason B. Torchinsky

EXHIBIT A

Expert Report of Thomas M. Bryan
Expert in Demography for the
Louisiana Attorney General

Robinson v. Ardoin

and

Galmon v. Ardoin

April 29, 2022

EXPERT REPORT OF THOMAS M. BRYAN

I, Thomas M. Bryan, affirm the conclusions I express in this report are provided to a reasonable degree of professional certainty.

EXPERT QUALIFICATIONS

I am an expert in demography with more than 30 years of experience. Described more fully below, I have been retained by the Louisiana Attorney General's office as an expert to provide redistricting analysis related to State Congressional, State Senate and State Legislative redistricting plans.

I graduated with a Bachelor of Science in History from Portland State University in 1992. I graduated with a Master of Urban Studies (MUS) from Portland State University in 1996, and in 2002 I graduated with a Master in Management and Information Systems (MIS) from George Washington University. Concurrent with earning my Management and Information Systems degree, I earned my Chief Information Officer certification from the GSA[1]

My background and experience with demography, census data and advanced analytics using statistics and population data began in 1996 with an analyst role for the Oregon State Data Center. In 1998 I began working as a statistician for the US Census Bureau in the Population Division – developing population estimates and innovative demographic methods. In 2001 I began my role as a professional demographer for ESRI Business Information Solutions, where I began developing my expertise in Geographic Information Systems (GIS) for population studies. In May 2004 I continued my career as a demographer, data scientist and expert in analytics in continuously advanced corporate roles, including at Altria and Microsoft through 2020.

In 2001 I developed a private demographic consulting firm "BryanGeoDemographics" or "BGD". I founded BGD as a demographic and analytic consultancy to meet the expanding demand for advanced analytic expertise in applied demographic research and analysis. Since then, my consultancy has broadened to include litigation support, state and local redistricting, school redistricting, and municipal infrastructure initiatives. Since 2001, I have undertaken over 150 such engagements in three broad areas:

- state and local redistricting,
- applied demographic studies, and
- school redistricting and municipal infrastructure analysis.

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1 Granted by the General Services Administration (GSA) and the Federal IT Workforce Committee of the CIO Council. http://www.gwu.edu/~mastergw/programs/mis/pr.html.

My background and experience with redistricting began with McKibben Demographics from 2004-2012, when I provided expert demographic and analytic support in over 120 separate school redistricting projects. These engagements involved developing demographic profiles of small areas to assist in building fertility, mortality and migration models used to support long-range population forecasts and infrastructure analysis. Over this time, I informally consulted on districting projects with Dr. Peter Morrison. In 2012 I formally began performing redistricting analytics and continue my collaboration with Dr. Morrison to this day. I have been involved with over 40 significant redistricting projects, serving roles of increasing responsibility from population and statistical analyses to report writing to directly advising and supervising redistricting initiatives. Many of these roles were served in the capacity of performing Gingles analyses, risk assessments and Federal and State Voting Rights Act (VRA) analyses in state and local areas.

In each of those cases, I have personally built, or supervised the building of, one or more databases combining demographic data, local geographic data and election data from sources including the 2000, the 2010 and now 2020 decennial Census. I also innovated the use of the US Census Bureau's statistical technique of "iterative proportional fitting" or "IPF" of the Census Bureau's American Community Survey, and the Census Bureau's Special Tabulation of Citizen Voting Age Population Data to enable the development of districting plans at the Census block level. This method has been presented and accepted in numerous cases we have developed or litigated. These data have also been developed and used in the broader context of case-specific traditional redistricting principles and often alongside other state and local demographic and political data.

In 2012 I began publicly presenting my work at professional conferences. I have developed and publicly presented on measuring effective voting strength, how to develop demographic accounting models, applications of using big data and statistical techniques for measuring minority voting strength – and have developed and led numerous tutorials on redistricting. With the delivery of the 2020 Census, I have presented on new technical challenges of using 2020 Census data and the impact of the Census Bureau's new differential privacy (DP) system. This work culminated with being invited to chair the "Assessing the Quality of the 2020 Census" session of the 2021 Population Association of America meeting, featuring Census Director Ron Jarmin.

I have written professionally and been published since 2004. I am the author of "Population Estimates" and "Internal and Short Distance Migration" in the definitive demographic reference "The Methods and Materials of Demography". In 2015 I joined a group of professional demographers serving as experts in the matter of Evenwel, et al. v. Texas case. In Evenwel I served in a leadership role in writing an Amicus Brief on the use of the American Community Survey (ACS) in measuring and assessing one-person, one vote. In 2019 I co-authored "Redistricting: A Manual for Analysts, Practitioners, and Citizens", and in 2021 I co-authored "The Effect of the Differential Privacy Disclosure Avoidance System Proposed by the Census Bureau on 2020 Census Products".

I have been deposed once in the last four years, in the matter of *Harding v. County of Dallas*, and have testified once, in the matters of *Milligan v. Merrill*, *Thomas v. Merrill* and *Singleton v. Merrill* over Alabama's Congressional redistricting initiatives.

I maintain membership in numerous professional affiliations, including:

- International Association of Applied Demographers (Member and Board of Directors)
- American Statistical Association (Member)
- Population Association of America (Member)
- Southern Demographic Association (Member)

My full CV, including my 30 years of demography experience, is attached as Appendix 5.

I am being compensated at my customary rate of $450/hour. My compensation is not dependent on my conclusions or opinions.

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

1. I was engaged by the Louisiana Attorney General's office to assess the characteristics of five congressional redistricting plans and to determine:

   a. whether the plans meet the numerosity criteria from the first prong of Gingles[2]; and

   b. if there was evidence that race appeared to predominate in the design of any of the plans.

2. In this report, I explore the demographic definition of minorities and show how different definitions can generate different conclusions about whether a district is a "majority" or not. Using measures of Black alone, Black (by the DOJ VRA definition) and Any Part Black (APB) Voting Age Population – we assess the Enrolled Plan and each of the Plaintiff's four Illustrative Plans in detail. Each of the Plaintiff's Illustrative Plans have two purported Black districts – but whether they are *majority* Black districts depends on which demographic definition of Black is used. As I will show: only by the most generous definition of Black, the any part black (APB) measure, do any of the Illustrative Plans meet the traditional majority minority criteria of over 50% + 1.

3. The Voting Age Population (VAP) by race and ethnicity by district for the Enrolled Plan is shown in **Appendix 1.A**. The Enrolled Plan has one majority Black district (District 2) no matter the definition of Black that is used. The VAP by race and ethnicity for the Robinson Illustrative Plan and the Galmon Illustrative Plans 1-3 are shown in **Appendix 1.B through Appendix 1.E**. Each Plaintiff Illustrative plan has two Black districts: 2 and 5, which could be considered either a minority or a majority Black depending on the demographic definition of Black used.

[2] Under the Gingles test, plaintiffs must show the existence of three preconditions:

- The racial or language minority group must be "sufficiently large and geographically compact to constitute a majority in a single-member district";
- The minority group is "politically cohesive" (meaning its members tend to vote similarly); and
- The "majority votes sufficiently as a bloc to enable it ...to usually to defeat the minority's preferred candidate."

4. In an effort to determine whether race predominated in the design of each plan – I executed a comprehensive geographic splits analysis. I not only analyzed the number of splits at different levels of geography, but deeply explored the size and type of population that were impacted by them. While the Plaintiff's Illustrative Plans have fewer place splits than the Enrolled Plan, there is evidence that virtually all of the Plaintiff's place splits are made almost surgically along racial lines. This is evident in the larger cities such as Lafayette, New Orleans and Baton Rouge – and smaller cities such as Alexandria and Monroe alike.

5. Based on the surgical, divisive nature of the splits in each of the Plaintiff's Illustrative Plans across Louisiana's places, I conclude that race was the prevailing factor in their design.

II. ASSIGNMENT

6. The Louisiana Attorney General has asked me to independently review and assess the features and characteristics of the Louisiana Congressional HB1 / SB5 Enrolled Redistricting Plan and compare them with each of the Plaintiff's Illustrative Plans, as follows:

   A. HB1 / SB5 Enrolled

   B. Robinson Illustrative Plan

   C. Galmon Illustrative 1 Plan

   D. Galmon Illustrative 2 Plan

   E. Galmon Illustrative 3 Plan

7. In Section III, I review the performance of these different Louisiana congressional redistricting plans with the following metrics:

   A. Demographic characteristics

   B. Geographic splits;

8. In Section IV, I present my conclusions.

9. In forming my opinions, I have considered all materials cited in this report and the appendices. I have also considered some pleadings and other filings in this matter; as well as technical resources such as Morrison & Bryan, Redistricting: A Manual for Analysts, Practitioners, & Citizens (Springer 2019) and the U.S. DOJ, Guidance under Section 2 of the Voting Rights Act, 52 U.S.C. 1301, for redistricting and methods of electing government bodies (Sept. 1, 2021).

10. I reserve the right to further supplement my report and opinions.

III. REDISTRICTING PERFORMANCE

A. Population and Characteristics

11. I began my assessment by examining the population movement in Louisiana between 2010 and 2020 that necessitated the decennial redistricting process. By 2020, the population in Louisiana had departed from where it had originally been drawn at the beginning of the decade. Using the Block Assignment File (also known as a Block Equivalency file) for the Senate Bill 5 - Enrolled - Congress – Hewitt and House Bill 1 - Enrolled - Congress - Schexnayder plans (which are identical) that I procured on or about April 17, 2022 from https://redist.legis.la.gov/HouseSenateBlockEquiv - I joined Census 2020 PL94171 data for each of the Louisiana Census blocks – then summed the total population and population by race and ethnicity data by each of six congressional districts for the existing Louisiana plan and each new plan I was asked to evaluate.

12. The main point of reference for the changes necessitated by redistricting is the total population deviation. For the Louisiana congressional plan is the total 2020 Census population of Louisiana of 4,657,757 divided by six districts – or a "target" population of 776,292.83. In ***Table III.A.1*** the numerical minimum and maximum values (the basis for the calculation of deviation) are shown for each plans. As of 2020, the existing Louisiana congressional plan had a deviation of 88,120. Louisiana District 6 had 816,466 population (+40,173, or +5.2% above target ideal), while District 4 had 728,346 population (-47,947, or -6.2% below target ideal).

13. In looking at the new plans - some have modest numerical deviations, but none of these rise to the point of being a measurable or meaningful percent deviation. As shown in ***Table III.A.1*** the Enrolled (Enacted) Plan has a total population deviation of 65. In the Robinson Illustrative Plan – the deviation is 51, and in each of the subsequent Galmon Illustrative Plans 1-3, the deviations are only 1.

Table III.A.1 Total Population of the Existing Louisiana Congressional Plan, the Enrolled Plan and Plaintiff's Illustrative Plans

District	Existing Louisiana Plan	HB1 / SB5 Enrolled Plan	Robinson Illustrative Plan	Galmon Illustrative Plan 1	Galmon Illustrative Plan 2	Galmon Illustrative Plan 3
1	812,585	776,268	776,286	776,292	776,293	776,293
2	775,292	776,317	776,291	776,293	776,293	776,293
3	785,824	776,275	776,280	776,293	776,293	776,293
4	728,346	776,333	776,280	776,293	776,293	776,293
5	739,244	776,277	776,331	776,293	776,293	776,293
6	816,466	776,287	776,289	776,293	776,292	776,292
Total	**4,657,757**	**4,657,757**	**4,657,757**	**4,657,757**	**4,657,757**	**4,657,757**
Minimim	728,346	776,268	776,280	776,292	776,292	776,292
Target	776,292.8	776,292.8	776,292.8	776,292.8	776,292.8	776,292.8
Maximum	816,466	776,333	776,331	776,293	776,293	776,293
Deviation #	88,120	65	51	1	1	1

14. Next, I refer to the final text of the SB5 Bill here: https://www.legis.la.gov/legis/ViewDocument.aspx?d=1248635. Page 7 of this report provides a population summary of the plan, shown in ***Table III.A.2*** below. The demographic statistics in this report precisely match my analysis of demographic statistics by district generated from the HB1 and SB5 Block Assignment Files (BAF) I downloaded from the https://redist.legis.la.gov/HouseSenateBlockEquiv website – the results of which I show in ***Table III.A.1*** above.

Table III.A.2 Population and Deviations from the Enrolled Plan Statistics Report

Plan: Senate Bill 5 Enrolled

Districts:	# of Members	Actual Population	Ideal Population	Absolute Deviation	Relative Deviation
District 1	1	776,268	776,292	-24	-0.003%
District 2	1	776,317	776,292	25	0.003%
District 3	1	776,275	776,292	-17	-0.002%
District 4	1	776,333	776,292	41	0.005%
District 5	1	776,277	776,292	-15	-0.002%
District 6	1	776,287	776,292	-5	-0.001%
Grand Total:	6	4,657,757	4,657,752		

Ideal Population Per Member:	776292		
Number of Districts for Plan Type:	6		
Range of District Populations:	776,268	to	776,333
Absolute Mean Deviation:	11		
Absolute Range:	-24	to	41
Absolute Overall Range:	65		

Ideal - Actual:	***-5***
Remainder:	***5***
Unassigned Population:	***0***

15. With this analysis in mind, it is concerning that there are two references to the Enrolled Plan's deviations in the Robinson Complaint that are inconsistent. On Page 25 at Para 73, the Robinson Complaint states "Representative Schexnayder asserted that his proposed map was his best effort to achieve population equality. However, the population deviation in H.B. 1 ranges from 29 voters to -17 voters". There is no reference for this claim, and an analysis of the Voting Age Population (VAP) of the Enrolled Plan shows the deviation to be much, much higher than 29 to -17 (a total of 46). In examining **Appendix 1.A HB1 / SB5 Enrolled Plan Voting Age Population**, I note that the minimum VAP of this plan is found in District 3 (with 586,488) and the maximum VAP of this plan is found in District 1 (with 601,559) for a total VAP deviation of 15,111.

16. In the same Robinson Complaint on Page 27 at Para 80, it states "Representative Duplessis pointed out that on equal population, S.B. 5 [had] a deviation of 128 people,". There is no source for this number, but I ascertained from an examination of statistics for the *Engrossed* Plan statistics here: https://www.legis.la.gov/legis/ViewDocument.aspx?d=1245772 that the population deviation for this plan was 128. I assume the *Engrossed* Plan is the plan referred to in this part of the Robinson complaint. The claim is irrelevant at this point, because the Engrossed Plan is not the plan that was enacted.

17. It is also worth noting that the analysis presented in the Plaintiff's expert Mr. Cooper's report does not appear to analyze or report findings based on the official Enrolled Plan either. In Figure 10 "2022 Plan – 2020 Census" of Mr. Cooper's expert report - he presents a demographic summary that he represents as being for the Enacted Plan, and again in

Exhibit H-1 of Mr. Cooper's report, "Population Summary Report, Louisiana Congress -- 2022 Enacted Plan". In comparing the figures from Cooper's tables with an actual, accurate demographic summary of the Enrolled Plan in ***Table III.A.2*** – Mr. Cooper's numbers are categorically different. An exploratory analysis of the demographic statistics from the *Engrossed* (not Enrolled, or the actual Enacted) plan are published here: https://www.legis.la.gov/legis/ViewDocument.aspx?d=1245772. A review of the "Plan Statistics" table at approximately page 9 reveals that the *Engrossed* Plan is the plan that Cooper apparently incorrectly characterizes as the "Enacted Plan" and goes on to analyze and critique at length. This numeric conclusion is corroborated by a visual examination of Cooper's Figure 11 "Louisiana U.S. House -- Enacted 2022 Plan" which reveals numerous geographic inconsistencies with the Enrolled Plan map. The Parishes of Jefferson Davis, Calcasieu and Rapides are clearly split while those parishes of Grant, St. Martin and St. Mary (which are split in the Enrolled Plan) are not.

18. The demographic summaries, illustrative maps and split analyses in Mr. Cooper's report all diverge from the results obtained from a similar analysis of the HB1 / SB5 Enrolled Plan. In order to independently confirm that Mr. Cooper used the Engrossed Plan in his analysis - I developed a series of maps and ran analyses from the other plans based on House and Senate Bill Block Equivalency Files (https://redist.legis.la.gov/HouseSenateBlockEquiv). I found that in fact, the results in Cooper's report are identical to the results obtained across all analyses when using the *Engrossed* Plan – not the actual *Enrolled* Plan.

19. In the following analysis, I assess and compare the population characteristics of the Louisiana HB1 / SB5 Enrolled Plan, the Robinson Illustrative Plan, and the Galmon Illustrative Plans 1, 2 and 3. This analysis includes measures of the total population, the white alone, non-Hispanic population (WNH), Any Part Black (APB), Black alone, non-Hispanic (BNH), all other non-Hispanic (including Asian, Native Hawaiian and Pacific Islander (NHPI), American Indian and Alaskan Native (AIAN), some other race and multi-race), and Hispanic population.

20. The VAP by race and ethnicity by district for the Enrolled Plan is shown in **Appendix 1.A**. The Enrolled Plan has one majority Black district (District 2) no matter the definition of Black that is used. The VAP by race and ethnicity for the Robinson Illustrative Plan and the Galmon Illustrative Plans 1-3 are shown in **Appendix 1.B through Appendix 1.E**. Each has two Black districts: 2 and 5, which are either a minority or a majority depending on the definition you use.

21. In the field of demography, and indeed in redistricting cases, the definition of a population in question is critical. The U.S. Census allows respondents to self-declare their ethnic and racial identification:

> "In order to facilitate enforcement of the Voting Rights Act, the Census Bureau asks each person counted to identify their race and whether they are of Hispanic or Latino origin. Beginning with the 2010 Census (and continuing in 2020) the racial categories available in the Census were: white, Black, American Indian, Asian, Native Hawaiians and other Pacific Islanders, and Some Other Race. Persons of Hispanic or Latino origin might be of any race. Persons were given the opportunity to select more than one race – and that race could be in combination with Hispanic or non-Hispanic origin." [3]

22. The Census Bureau reports some 288 different population counts for each level of Census geography in the country (71 in P1 "Race", 73 in P2 "Hispanic or Latino, and Not Hispanic or Latino by Race", 71 in P3 "Race for the Population 18 Years and Over" and 73 in P4 "Hispanic or Latino, and Not Hispanic or Latino by Race for the Population 18 Years and Over" The result is that the definition of "Black" and other races in Louisiana can be Black alone, or in combination with multiple other races or possibly even also Hispanic and other races. If one adds up the different combination of multiple races, the totals will exceed 100% because of double counting. That is – someone who self-reports that they are Black and Asian could be counted in the total of both groups. This can only be accounted for and adjusted using sophisticated demographic allocation techniques.[4] As shown in **Appendix 1.F,** there are 32 possible Black alone or in combination possibilities. As shown in **Appendix 1.G**, there are 64 possible Black alone or in combination possibilities when divided by Hispanic origin.

23. For the purposes of redistricting, there are multiple definitions of race to consider. The first is race alone. This is the most exclusive definition, excluding minorities from a racial category who are multi-race or of Hispanic origin. This is the definition that has been used historically, prior to the evolution of the multi-race definition in the census.

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[3] "How to Draw Redistricting Plans That Will Stand Up In Court", National Conference of State Legislators (NCSL), January 22, 2011, p. 17.

[4] See for example Ingram, Deborah D.; Parker, Jennifer D.; Schenker, Nathaniel; Weed, James A.; Hamilton, Brady; Arias, Elizabeth; Madans, Jennifer H. (2003) "United States Census 2000 Population with Bridged Race Categories. Vital and Health Statistics. Data Evaluation and Methods Research."

24. The next is what I will refer to as the "DOJ" definition. For the purposes of the Voting Rights Act, the DOJ has provided "Guidance under Section 2 of the Voting Rights Act, 52 U.S.C. 10301, for redistricting and methods of electing government bodies"[5]. This document provides a definition of minority populations that include both race alone and a minority race paired with white, as follows:

> "The Department's initial review will be based upon allocating any response that includes white and one of the five other race categories identified in the response. Thus, the total numbers for "Black/African American," "Asian," "American Indian/Alaska Native," "Native Hawaiian or Other Pacific Islander," and "Some other race" reflect the total of the single-race responses and the multiple responses in which an individual selected a minority race and white race."

The DOJ goes on to say in their guidance:

> "The Department will then move to the second step in its application of the census data by reviewing the other multiple-race category, which is comprised of all multiple-race responses consisting of more than one minority race. Where there are significant numbers of such responses, the Department will, as required by both the OMB guidance and judicial opinions, allocate these responses on an iterative basis to each of the component single-race categories for analysis. Georgia v. Ashcroft, 539 U.S. 461, 473, n.1 (2003)."

Last, the DOJ distinguishes their race from ethnicity classifications:

> As in the past, the Department will analyze Hispanic/Latino persons as a separate minority group for purposes of enforcement of the Voting Rights Act, pursuant to Sections 2, 4(f)(2), and 14(c)(3) of the Act. 52 U.S.C. §§ 10301, 10303(f)(2), 10310(c)(3). The Census asks respondents to answer both the Hispanic origin question and the race question. A Hispanic/Latino tabulation of Census data includes those who respond affirmatively to the Hispanic origin question, irrespective of their response to the race question, e.g., white, a minority race, "some other race" or multiple races. If there are significant numbers of responses in a jurisdiction that self-identify as Hispanic/Latino and one or more minority races (for example, Hispanics/Latinos who list their race as Black/African American), the Department will conduct its initial analysis by allocating those responses to

[5] https://www.justice.gov/opa/press-release/file/1429486/download

the Hispanic/Latino category and then repeat its analysis by allocating those responses to the relevant minority race category.

25. The math of the first step is what I use here for the calculation of "DOJ Black Voting Age Population (VAP)" – that is, Black + white, non-Hispanic. The population that can be considered in the second DOJ step is usually small, but as we will see, is still very important in assessing whether a district meets the 50% + 1 of minority Voting Age Population definition criteria from Gingles.

26. The last race definition is what I refer to as "Any Part" or "All". This definition counts a minority by race alone or in combination with other races (no matter how many other races are mentioned) as well as by Hispanic. Beyond the DOJ definition for example – if someone responds to the census by self-identifying as Black, white, Asian, Native Hawaiian Pacific Islander, American Indian Alaskan Native and "some other" – then by the "Any Part Black" definition they are counted as Black even though it was only one of races reported. For the purposes of the Louisiana analysis, we use this definition to refer to Any Part Black (or "APB"). Again, **Appendices 1.F and 1.G** show all of the combinations and counts of Louisiana Black populations that contribute to this definition.

27. The tables below illustrate that only the Enrolled Plan meets the Gingles numerosity test for VAP under Black alone or the DOJ Black definition. None of the Plaintiff's Illustrative Plans have two districts that meet the Gingle's criteria of majority under the DOJ Black or APB definition. All of the Plaintiff's Illustrative Plans have two majority VAP districts only when using the APB definition.

28. I begin with the detailed percent Black characteristics of the Enrolled HB1 / SB5 Plan in ***Table III.A.3***. District 2 has a Black alone VAP share of 56.34%. With the addition of Black and white population comprising the DOJ definition, that share rises to 57.03% When Any Part Black (APB) is considered – the share rises to 58.65%. Other districts vary from 13.48% to 33.82% APB.

Table III.A.3 HB1 / SB5 Enrolled Plan Black Share of Voting Age Population

HB1 / SB5 Plan	Black Alone	Black DOJ	Any Part Black
1	12.13%	12.49%	13.48%
2	**56.34%**	**57.03%**	**58.65%**
3	23.38%	23.94%	24.63%
4	32.54%	33.09%	33.82%
5	31.82%	32.33%	32.91%
6	22.87%	23.27%	23.86%

29. Next, I detail the percent Black characteristics of the Robinson Illustrative Plan in ***Table III.A.4***.

a. District 2 only has a Black alone population of 48.73% - not a majority. With the addition of the Black and white population comprising the DOJ definition, that share rises to 49.39% - still not a majority. When Any Part Black (APB) is considered – the share rises to 50.96%, or a majority only when every combination of Black alone or in combination is considered.

b. District 5 has a Black alone share of 50.63%. With the addition of Black and white population comprising the DOJ definition, that share rises to 51.25% When Any Part Black (APB) is considered – the share rises to 52.05% - all majorities.

Table III.A.4 Robinson Illustrative Plan Black Share of Voting Age Population

Illustrative Plan	Black Alone	Black DOJ	Any Part Black
1	16.84%	17.24%	18.29%
2	**48.73%**	**49.39%**	**50.96%**
3	16.77%	17.29%	17.91%
4	30.76%	31.25%	31.90%
5	**50.63%**	**51.25%**	**52.05%**
6	15.31%	15.68%	16.19%

30. Next, I detail the percent Black characteristics of the Galmon Illustrative 1 Plan in ***Table III.A.5***.

a. District 2 only has a Black alone VAP share of 47.77% - not a majority. With the addition of Black and white population comprising the DOJ definition, that share rises to 48.41% - also not a majority. When Any Part Black (APB) is considered – the share rises to 50.16%, or a majority only when every combination of Black alone or in combination is considered.

b. District 5 has a Black alone share of 48.62% - not a majority. With the addition of Black and white population comprising the DOJ definition, that share rises to 49.22% - also not a majority. When Any Part Black (APB) is considered – the share rises to 50.04% - an extremely thin majority.

Table III.A.5 Galmon Illustrative 1 Plan Black Share of Voting Age Population

Illustratuve 1 Plan	Black Alone	Black DOJ	Any Part Black
1	16.95%	17.35%	18.18%
2	**47.77%**	**48.41%**	**50.16%**
3	18.55%	19.10%	19.75%
4	30.68%	31.17%	31.82%
5	**48.62%**	**49.22%**	**50.04%**
6	16.36%	16.74%	17.24%

31. Next, I detail the percent Black characteristics of the Galmon Illustrative 2 Plan in ***Table III.A.6***.

a. District 2 only has a Black alone VAP share of 48.27% - not a majority. With the addition of Black and white population comprising the DOJ definition, that share rises to 48.92% - also not a majority. When Any Part Black (APB) is considered – the share rises to 50.65%, or a majority only when every combination of Black alone or in combination is considered.

b. District 5 has a Black alone share of 48.65% - not a majority. With the addition of Black and white population comprising the DOJ definition, that share rises to 49.25% - also not a majority. When Any Part Black (APB) is considered – the share rises to 50.04% - again an extremely thin majority.

Table III.A.6 Galmon Illustrative 2 Plan Black Share of Voting Age Population

Illustrative 2 Plan	Black Alone	Black DOJ	Any Part Black
1	15.29%	15.67%	16.51%
2	**48.27%**	**48.92%**	**50.65%**
3	20.39%	20.93%	21.59%
4	27.52%	28.00%	28.65%
5	**48.65%**	**49.25%**	**50.04%**
6	18.74%	19.14%	19.67%

32. Next, I detail the percent Black characteristics of the Galmon Illustrative 3 Plan in ***Table III.A.7***.

a. District 2 has a Black alone VAP share of 47.77% - not a majority. With the addition of Black and white population comprising the DOJ definition, that share rises to 48.41% - also not a majority. When Any Part Black (APB) is considered – the share rises to 50.16%, or a majority only when every combination of Black alone or in combination is considered.

b. District 5 has a Total Black Population of 50.23%. With the addition of Black and white population comprising the DOJ definition, that share rises to 50.81%. When Any Part Black (APB) is considered – the share rises to 51.63%.

Table III.A.7 Galmon Illustrative 3 Plan Black Share of Voting Age Population

Illustrative 3 Plan	Black Alone	Black DOJ	Any Part Black
1	17.35%	17.74%	18.52%
2	**47.77%**	**48.41%**	**50.16%**
3	16.82%	17.35%	17.98%
4	31.79%	32.29%	32.96%
5	**50.23%**	**50.81%**	**51.63%**
6	15.14%	15.53%	16.09%

B. District Boundaries, Parish and Place Geographic Splits Analysis.

33. I next turn my attention to the unity of administrative geography in Louisiana. There are three relevant layers of administrative geography in Louisiana, including parishes (the equivalent of counties in other states), places and VTDs - a generic term adopted by the Bureau of the Census to include the wide variety of small polling areas, such as election districts, precincts, or wards, that State and local governments create for the purpose of administering elections. [6]. The Louisiana Redistricting Criteria Joint Rule 21 specifically states (at H.) "All redistricting plans shall respect the established boundaries of parishes, municipalities, and other political subdivisions and natural geography of this state to the extent practicable".

34. The US Census Bureau provides useful details in understanding the number and characteristics of these geographic layers in Louisiana, as follows:[7]

- Parishes: There are 64 county equivalents in Louisiana known as parishes.
- Places: There are 488 places in Louisiana; 304 incorporated places and 184 census designated places (CDPs). The incorporated places consist of 69 cities, 128 towns, and 107 villages.

In addition to these geographies, we analyze 3,540 VTDs acquired from the 2020 Census TIGER program[8].

35. A "splits" analysis would conventionally extend to the number of split pieces of geography and stop there. Numerically fewer splits are *usually* indicative of a better performing plan than one with more splits. However - in the case of Louisiana, the raw counts of splits disguise the true nature and characteristics of the splits of places in all four of the Plaintiff's Illustrative Plans. In each, there is clearly a demographic pattern to the way in which places were split, and the characteristics of the populations in the resulting pieces begged further examination. I begin my analysis with a detailed examination of places, followed by observations about parish splits, concluding with a summary of VTD splits.

36. An examination of the number of place splits by plan in ***Table III.B.1*** shows the Enrolled Plan with 19 place splits. The Robinson Illustrative Plan follows with slightly more at 21, and the Galmon Illustrative Plans 1-3 follow with 13, 16 and 16 place splits respectively. What is significant is *how* each of these plans splits places – when they do.

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[6] https://www2.census.gov/geo/pdfs/reference/GARM/Ch14GARM.pdf

[7] https://www.census.gov/geographies/reference-files/2010/geo/state-local-geo-guides-2010/louisiana.html and current TIGER shapefiles

[8] https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.2020.html

Table III.B.1 Louisiana Place Splits by Plan

Plan	Split	Unsplit
HB1 / SB5 Enrolled	19	285
Robinson Illustrative Plan	21	283
Galmon Illustrative Plan 1	13	291
Galmon Illustrative Plan 2	16	288
Galmon Illustrative Plan 3	16	288

37. In the course of my analysis, I created tables showing not only the number of splits for each plan – but the size and population characteristics of the pieces that result from each place split. In **Appendix 2 Detailed Place Splits Analysis** I show the total population (and share), the white population (and share) and APB population (and share) for each place piece split, by plan.

38. In **Appendix 2.A HB1 / SB5 Enrolled Plan Place Splits** I show the population splits and demographic characteristics for the Enrolled Plan. Using Addis Town as an example – there are 6,700 of the 6,731 of the total population (99.54%) in District 2. Then, there are 3,415 white people (99.74%) and 2,765 Black people (99.74%) in District 2. The small remaining population is in District 6. I would characterize this split as being small and impacting the white and Black population equitably. This equity does not prevail for all cities in the Enrolled Plan though. For example, in Baton Rouge: 34.73% of the total population is in District 2, reflecting a balance of 5.41% of the white population and 57.21% of the Black population.

39. In the following **Appendix 2 Tables 2.B through 2.E** I report the detailed demographic size and impact of the splits incurred by the Plaintiff's Illustrative Plans. While each has fewer splits - an examination of these tables quickly reveals that there are much more significant demographic *impacts* of the splits made by those plans. But how do we quantify *how much more* these Illustrative Plans splits impact and divide the population (particularly by race) than the Enrolled Plan? A useful way for quantifying the degree to which a plan splits administrative geography by race is by measuring how much of a minority population would be in a given piece – if it had an exact same proportionate share as the total population. In demography = this is known as an index of misallocation[9]. For example, using the Galmon Illustrative 3 Plan split of Lafayette as shown in ***Table III.B.2*** below. In this plan, 70% of the total population is in the District 3 split, and 30% of the total

[9] Swanson, D.A. 1981 "Allocation Accuracy in Population Estimates: An Overlooked Criterion with Fiscal Implications." pp. 13-21 in Small Area Population Estimates, Methods and Their Accuracy and New Metropolitan Areas Definitions and Their Impact on the Private and Public Sector, Series GE-41 No.7, U.S. Bureau of the Census.

population is in the District 5 split. If the Black population were distributed evenly around the city, and a split was created randomly, we would expect the Black[10] population to be split the same as the total population. That is - we would expect that 70% of the 39,354 Black population in Lafayette would have ended up in District 3 and 30% of the Black population would have ended up in District 5.

Table III.B.2 Galmon Illustrative 3 Plan – Lafayette Expected Black Population

District	Total Pop	Total Percent	Expected Black Pop	
3	84,924	70.0%	27,536	=39,354 * 70%
5	36,450	30.0%	11,818	=39,354 * 30%

40. Instead, we find that the Black population in Lafayette was split in almost the exact opposite direction of the total population. As shown in ***Table III.B.3***- the Black population of 13,028 (or 33%) is split into District 3, while 26,326 Black population is split into District 5.

Table III.B.3 Galmon Illustrative 3 Plan – Lafayette Actual Black Population

District	Total Pop	Total Percent	Actual Black Pop	Black Pop Percent
3	84,924	70.0%	13,028	33%
5	36,450	30.0%	26,326	67%

41. The outcome, as shown in ***Table III.B.4*** is that in the Galmon Illustrative 3 Plan - 14,508 Blacks have been redistricted and split differently (27,536 expected minus 13,028 actual – or 26,326 actual minus 11,818 expected) in Lafayette than you would expect if the plan had been drawn race-blind. That is, they were demographically misallocated. As I am about to show with a series of maps of race by plan– it can be clearly seen in each of the Plaintiff's Illustrative Plans that the population has *not* been split and distributed equally in Louisiana's places.

[10] Any Part Black (APB)

Table III.B.4 Galmon Illustrative 3 Plan – Lafayette Black Population Difference from Expected

District	Expected Black	Actual Black	Black Pop Difference
3	27,536	13,028	14,508
5	11,818	26,326	-14,508

42. Of course, it would be unusual for there to be *no* differences between the expected and actual splits of minority populations. But we can easily quantify the extent to which different plans deviate by summing these differences between expected and actual for places and parishes for each of these plans. From ***Table III.B.5*** below it can clearly be seen that there are significant differences in the impact of actual versus expected population by plan. The Robinson Illustrative Plan misallocates nearly 40,000 more Blacks than the Enrolled Plan with its splits of places. And the Galmon Plans misallocate 10,011, 13,811 and 20,778 respectively more than the Enrolled Plan.

43. Similarly, the Robinson Illustrative Plan misallocates over 46,000 more Blacks than the Enrolled Plan with its splits of parishes. And the Galmon plans misallocate 43,044, 33,067 and 54,809 respectively more than the Enrolled Plan. There can be no argument that each of the Illustrative Plans act to significantly split the minority Black population from the white population across Louisiana places and parishes.

Table III.B.5 Black Population Difference from Expected by Plan: Louisiana Places and Parishes

Plan	Place	Parish
HB1 / SB5 Enrolled	57,843	132,930
Robinson Illustrative	97,341	179,066
Galmon Illustrative 1	67,854	175,974
Galmon Illustrative 2	71,654	165,997
Galmon Illustrative 3	78,621	187,739

44. To expand on this concept, I created a series of maps showing the splits of Louisiana places and parishes by plan to show first exactly where places were split, then second to visually illustrate the demographics of the pieces that were split. I focus this analysis on Baton Rouge, New Orleans and Lafayette. Metairie CDP was minimally affected, and Shreveport was not affected at all by redistricting – so I do not analyze those. I add an analysis of Alexandria and Monroe to show the patterns I observe were not limited to the biggest places in the state.

45. HB1 / SB5 Enrolled Plan Place Splits: By necessity every decade, the existing Louisiana congressional plan boundaries needed to be updated. The HB1 / SB5 Enrolled Plan appears to be a "least change" approach. In the enrolled map – the changes to the existing plan were generally made away from city cores as seen in **Map Appendix A Louisiana Enrolled HB1 / SB5.** In looking at the new HB1 / SB5 Enrolled boundaries – there appears to be little to no change for New Orleans and Baton Rouge – and Lafayette, Alexandria and Monroe (among other smaller places) are not split at all. **Map Appendix F Baton Rouge Split HB1 / SB5 Enrolled Plan** shows Baton Rouge divided north and south in this plan. This split of the city follows the existing congressional district lines.

46. HB1 / SB5 Enrolled Plan Place Splits by Race: In looking at **Map Appendix AA Baton Rouge HB1 / SB5 Enrolled Plan** we see the historic subdivision of the city with most of the northern part of the city in Black majority minority **District 2.** However – a sizable portion of Black population from the east / northeast corner of the city remains in District 6. Referring to the **Appendix 2.A Detailed Splits Analysis** for the Enrolled plan – I show that nearly 54,000 of the Back residents (approximately 43%) reside in the District 6 portion of the city. As I will show shortly – this is *much more equitably* distributed than in any of the Illustrative Plans. In **Appendix FF New Orleans HB1 / SB5 Enrolled Plan** we see that the city of New Orleans is split by District 1 and District 2. Lafayette, Alexandria and Monroe are not split by the HB1 / SB5 Enrolled Plan.

47. Robinson Illustrative Plan Place Splits: This Illustrative plan departs significantly from the existing congressional district boundaries, as seen in **Map Appendix B Robinson Illustrative Plan**. Significant changes are made to the cores of the three large Louisiana cities. **Map Appendix G Baton Rouge Split** shows Baton Rouge trisected in this plan. **Map Appendix L New Orleans Split** shows the city split in this plan between District 1 and District 2. **Map Appendix P Lafayette** shows the city split almost exactly in half, north and south. **Map Appendix T Alexandria** shows the city split northeast to southwest between District 3 and District 5. And in **Map Appendix X Monroe** shows the city split with a small portion going to District 4 in the northwest with the remaining portion in District 5.

48. Robinson Illustrative Plan Place Splits by Race: In **Appendix BB, Baton Rouge Split by Race** is shown with % Any Part Black (APB) VAP by 2020 Census Block. District 5 appears to almost perfectly cut off the northern half (predominantly Black) part of the city. District 2 cuts off a smaller Black population to the SW. The remaining (predominantly white) part of the city is left to District 6. In looking at **Map Appendix GG New Orleans Existing Plan and Robinson Illustrative Plan**, we can see that the Robinson Illustrative Plan started with the existing congressional boundaries in New Orleans – then expanded them just slightly, capturing additional white population from District 2 – and moving them out of District 2 and into District 1. This appears to be a clear race based shifting of population. Next, looking at Lafayette. As with the division of Baton Rouge, an examination of **Map Appendix HH Lafayette Split by Race** shows the city divided cleanly along racial lines. In **Map Appendix LL Alexandria Split by Race**, it can be plainly seen that the predominantly white portion of the city in the southwest corner in District 3 is nearly perfectly cut off from the remaining, primarily Black part of the city in District 5. And in **Map Appendix PP Monroe Split by Race**, it can be plainly seen that the predominantly white portion of the city in the northwest corner is nearly perfectly cut off in District 4 from the remaining, primarily Black part of the city in District 5.

49. Galmon Illustrative 1 Plan Place Splits : This Illustrative Plan also departs significantly from the existing district boundaries, as seen in **Map Appendix C Galmon Illustrative 1 Plan**. Significant changes are also made to the cores of these three large cities. **Map Appendix H Baton Rouge Split** shows the city roughly split north/south in this plan between District 5 and District 6. **Map Appendix M New Orleans Split** shows the city split in this plan – but this split is unremarkable. It creates a large split piece of geography northeast towards Lake St. Catherine – but this area is relatively unpopulous But as with the Robinson Illustrative plan, **Map Appendix Q Lafayette** shows the city split almost exactly in half north/south. **Map Appendix U Alexandria** shows the city split northeast to southwest between District 4 and District 5. As with the HB1 / SB5 Enrolled Plan – the Galmon Illustrative 1 Plan does not split Monroe.

50. Galmon Illustrative 1 Plan Place Splits by Race: In **Appendix CC, Baton Rouge Split by Race** is shown with % Any Part Black (APB) by 2020 Census Block. As with the Robinson Illustrative Plan - District 5 appears to almost perfectly cut off the northern half (predominantly Black) part of the city. The remaining (predominantly white) part of the city is again left to District 6. As with the division of Baton Rouge, an examination of **Map Appendix II Lafayette Split by Race** shows the city almost perfectly divided cleanly along racial lines, north and south. In **Map Appendix NN Alexandria Split by Race**, it can be plainly seen that the predominantly white portion of the city in the southwest corner in District 3 is nearly perfectly cut off from the remaining, primarily Black part of the city in District 5.

51. Galmon Illustrative 2 Plan Place Splits : This Illustrative Plan also departs significantly from the existing district boundaries, as seen in **Map Appendix D Galmon Illustrative 2 Plan**. Significant changes are also made to the cores of these three large cities. **Map Appendix I Baton Rouge Split** shows the city roughly split north/south in this plan, with refinements beyond Galmon 1 to its southwest border in the downtown area. **Map Appendix N New Orleans Split** shows the city split in this plan – but this split is unremarkable. It creates a large split piece of geography northeast towards Lake St. Catherine – but this area is relatively unpopulous. But as with the Galmon Illustrative 1 Plan, **Map Appendix R Lafayette** shows the city split almost exactly in half north/south – just in a slightly different configuration. **Map Appendix V Alexandria** shows the city split northeast to southwest between District 4 and District 5. And in **Map Appendix Y Monroe** shows the city again split with a small portion going to District 4 with the remaining portion in District 5.

52. Galmon Illustrative 2 Plan Place Splits by Race: In **Appendix DD, Baton Rouge Split by Race** is shown with % Any Part Black (APB) by 2020 Census Block. As with the earlier Galmon Illustrative 1 Plan, District 5 appears to almost perfectly cut off the northern half (predominantly Black) part of the city. The remaining (predominantly white) part of the city is again left to District 6. Unlike the earlier Galmon 1 plan – the map drawer here tightened the downtown border between District 5 and District 6 to almost perfectly segregate Black and white neighborhoods. A close examination shows the line was made and adjusted at the block level for a nearly perfect racial population split. As with the division of Baton Rouge, an examination of **Map Appendix JJ Lafayette Split by Race again** shows the city almost perfectly divided cleanly along racial lines, north and south. In **Map Appendix OO Alexandria Split by Race**, it can be plainly seen that the predominantly white portion of the city in the southwest corner in District 3 is nearly perfectly cut off from the remaining, primarily Black part of the city in District 5. And in **Map Appendix RR Monroe Split by Race**, it can be plainly seen that again the predominantly white portion of the city in the northwest corner is nearly perfectly cut off in District 4 from the remaining, primarily Black part of the city in District 5.

53. Galmon Illustrative 3 Plan Place Splits : This Illustrative Plan also departs significantly from the existing district boundaries, as seen in **Map Appendix E Galmon Illustrative 3 Plan**. Significant changes are also made to the cores of these three large cities. **Map Appendix J Baton Rouge Split** shows the city roughly split north/south in this plan, with refinements to its southwest border in the downtown area beyond Galmon 1. **Map Appendix O New Orleans Split** shows the city split in this plan – but this split is unremarkable. It creates a large split piece of geography northeast towards Lake St. Catherine – but this area is relatively unpopulous But as with the Galmon Illustrative 1 plan, **Map Appendix S Lafayette** shows the city split almost exactly in half north/south. **Map Appendix W Alexandria** shows the city split northeast to southwest between District 3 and District 5. And in **Map Appendix Z Monroe** shows the city again split with a small portion going to District 4 with the remaining portion in District 5.

54. Galmon Illustrative 3 Plan Place Splits by Race: In **Appendix EE, Baton Rouge Split by Race** is shown with % Any Part Black (APB) by 2020 Census Block. As with the earlier Galmon Illustrative 1 Plan, District 5 appears to almost perfectly cut off the northern half (predominantly Black) part of the city. The remaining (predominantly white) part of the city is again left to District 6. Similar to the Galmon 2 plan – the map drawer here tightened the downtown border between District 5 and District 6 to almost perfectly segregate Black and white neighborhoods. A close examination shows the line was made and adjusted at the block level for a nearly perfect racial population split. As with the division of Baton Rouge, an examination of **Map Appendix KK Lafayette Split by Race again** shows the city almost perfectly divided clearly along racial lines, north and south. In **Map Appendix OO Alexandria Split by Race**, it can be plainly seen that the predominantly white portion of the city in the southwest corner in District 3 is nearly perfectly cut off from the remaining, primarily Black part of the city in District 5. And in **Map Appendix RR Monroe Split by Race**, it can be plainly seen that again the predominantly white portion of the city in the northwest corner is nearly perfectly cut off in District 4 from the remaining, primarily Black part of the city in District 5.

55. An examination of the number of parish splits by plan in ***Table III.B.6*** shows the Enrolled Plan with the most splits – at 15. The Robinson Illustrative plan follows with 14, and the Galmon Illustrative Plans follow with 10, 11 and 10 Parish splits respectively. I have already presented a summary of the differential impact of parish splits in ***Table III.B.5*** above – and my conclusion remains the same here. While there are numerically slightly fewer splits in each of the Plaintiff's Illustrative Plans than the Enrolled Plan – each of those impacts significantly more population by race.

Table III.B.6 Parish Splits by Plan

Plan	Split	Unsplit
HB1 / SB5 Enrolled	15	49
Robinson Illustrative Plan	14	50
Galmon Illustrative Plan 1	10	54
Galmon Illustrative Plan 2	11	53
Galmon Illustrative Plan 3	10	54

56. Finally, I share the splits of VTDs in ***Table III.B.7***. It is intuitive that the Enrolled Plan and the Robinson Illustrative Plans have 1 and 0 splits respectively – given that each plan has a small amount of population deviation. Work does not appear to have been done in either of these plans to split VTDs in order to drive the population deviation from a small, nominal amount to none. By comparison, the Galmon Illustrative 1 through 3 Plans have numerous VTD splits, which explains how each of these plans was able to achieve a minimum population deviation of 1. It is unusual to have this many splits, relative to the number of districts, however. Typically, only one VTD (and sometimes none) would need to be split by district to bring a plan into minimum deviation. The Louisiana Redistricting Criteria Joint Rule 21, states at G.(1) "To the extent practicable, each district within a redistricting plan submitted for consideration shall contain whole election precincts" and at G.(2) "If a VTD must be divided, it shall be divided into as few districts as practicable". My assessment of these VTD splits is that they are likely excessive.

Table III.B.7 VTD Splits by Plan

Plan	Split	Unsplit
HB1 / SB5 Enrolled	1	3,539
Robinson Illustrative Plan	0	3,540
Galmon Illustrative Plan 1	13	3,527
Galmon Illustrative Plan 2	10	3,530
Galmon Illustrative Plan 3	13	3,527

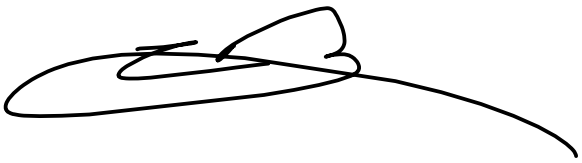
IV. CONCLUSION

57. For the reasons stated in this report and illustrated in the Appendices - I conclude that the Plaintiff's Illustrative Plans fail the voting age population and numerosity requirements for the majority minority districts using the Black alone non-Hispanic category and the DOJ Black formulation. Only when one adds multi-race Black with two up to additional five races in combination do you achieve two majority minority districts with > 50% of Black VAP.

58. My analysis shows that in order to achieve this tenuous result, the Plaintiff's Illustrative Plans have redrawn many of Louisiana's places to maximally divide the Black population from the rest of the population. While the Plaintiff's Illustrative Plans present a slightly smaller number of splits than the Enacted Plan, these smaller numbers belie the nature and character of those splits. In the Plaintiff's Illustrative Plans -the split of the cities in the eastern two thirds of the state and their associated parishes appear to be nearly surgically drawn by racial lines. Splitting these cities to cleave their white and Black populations apart was the only way to create two districts by the APB measure.

* * *

Submitted: April 29, 2022



Thomas M. Bryan

Appendix 1 Demographics

A. HB1 / SB5 Enrolled Plan: Voting Age Population by Race and Ethnicity

District	Total Pop	WNH Pop	APB NH	BNH NH	All Other NH	Hispanic
1	601,559	420,268	81,105	72,977	42,503	65,811
2	600,203	179,129	352,018	338,179	35,854	47,041
3	586,488	392,996	144,434	137,106	28,899	27,487
4	591,095	343,535	199,907	192,343	31,174	24,043
5	597,389	360,144	196,617	190,118	25,558	21,569
6	593,814	386,038	141,688	135,788	34,277	37,711
Grand Total	**3,570,548**	**2,082,110**	**1,115,769**	**1,066,511**	**198,265**	**223,662**

B. Robinson Illustrative Plan: Voting Age Population by Race and Ethnicity

District	Total Pop	WNH Pop	APB NH	BNH Pop	Other NH	Hispanic
1	603,084	394,140	110,315	101,553	42,773	64,618
2	603,764	218,098	307,670	294,198	40,066	51,402
3	586,948	428,229	105,115	98,440	31,630	28,649
4	596,366	357,220	190,267	183,466	31,689	23,991
5	589,193	252,112	306,701	298,337	20,064	18,680
6	591,193	432,311	95,701	90,517	32,043	36,322
Grand Total	**3,570,548**	**2,082,110**	**1,115,769**	**1,066,511**	**198,265**	**223,662**

C. Galmon Illustrative 1 Plan: Voting Age Population by Race and Ethnicity

District	Total Pop	WNH Pop	APB NH	BNH Pop	Other NH	Hispanic
1	599,826	396,685	109,041	101,677	41,193	60,271
2	603,092	225,537	302,513	288,076	37,720	51,759
3	586,519	415,185	115,841	108,807	31,869	30,658
4	596,695	357,357	189,880	183,088	31,611	24,639
5	592,316	260,464	296,402	287,986	23,698	20,168
6	592,100	426,882	102,092	96,877	32,174	36,167
Grand Total	**3,570,548**	**2,082,110**	**1,115,769**	**1,066,511**	**198,265**	**223,662**

D. Galmon Illustrative 2 Plan: Voting Age Population by Race and Ethnicity

District	Total Pop	WNH Pop	APB NH	BNH Pop	Other NH	Hispanic
1	598,980	399,732	98,862	91,591	42,331	65,326
2	606,036	229,831	306,982	292,507	36,913	46,785
3	585,553	406,600	126,424	119,366	29,970	29,617
4	592,745	369,521	169,811	163,140	34,225	25,859
5	593,183	261,385	296,852	288,597	23,038	20,163
6	594,051	415,041	116,838	111,310	31,788	35,912
Grand Total	**3,570,548**	**2,082,110**	**1,115,769**	**1,066,511**	**198,265**	**223,662**

E. Galmon Illustrative 3 Plan: Voting Age Population Characteristics

District	Total Pop	WNH Pop	APB NH	BNH Pop	Other NH	Hispanic
1	599,586	394,484	111,043	104,032	40,627	60,443
2	603,092	225,537	302,513	288,076	37,720	51,759
3	586,927	426,910	105,558	98,724	32,336	28,957
4	597,083	352,454	196,784	189,789	31,104	23,736
5	589,070	249,264	304,153	295,866	22,326	21,614
6	594,790	433,461	95,718	90,024	34,152	37,153
Grand Total	**3,570,548**	**2,082,110**	**1,115,769**	**1,066,511**	**198,265**	**223,662**

F. Louisiana Population with Black Alone and in Combination

P1 Total Pop	#	% of Total
Total:	4,657,757	100.0%
Black or African American alone	1,464,023	31.4%
White; Black or African American	43,631	0.9%
Black or African American; American Indian and Alaska Native	7,332	0.2%
Black or African American; Asian	2,323	0.0%
Black or African American; Native Hawaiian and Other Pacific Islander	419	0.0%
Black or African American; Some Other Race	13,305	0.3%
White; Black or African American; American Indian and Alaska Native	4,955	0.1%
White; Black or African American; Asian	985	0.0%
White; Black or African American; Native Hawaiian and Other Pacific Islander	121	0.0%
White; Black or African American; Some Other Race	2,995	0.1%
Black or African American; American Indian and Alaska Native; Asian	137	0.0%
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	40	0.0%
Black or African American; American Indian and Alaska Native; Some Other Race	374	0.0%
Black or African American; Asian; Native Hawaiian and Other Pacific Islander	170	0.0%
Black or African American; Asian; Some Other Race	128	0.0%
Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	46	0.0%
White; Black or African American; American Indian and Alaska Native; Asian	339	0.0%
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	46	0.0%
White; Black or African American; American Indian and Alaska Native; Some Other Race	1,250	0.0%
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander	64	0.0%
White; Black or African American; Asian; Some Other Race	67	0.0%
White; Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	30	0.0%
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	38	0.0%
Black or African American; American Indian and Alaska Native; Asian; Some Other Race	21	0.0%
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	1	0.0%
Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	47	0.0%
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	82	0.0%
White; Black or African American; American Indian and Alaska Native; Asian; Some Other Race	95	0.0%
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	3	0.0%
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	11	0.0%
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	8	0.0%
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	33	0.0%
Black Alone or In Combination	1,543,119	

G. Louisiana Population with Black Alone and in Combination by Hispanic Origin

P2 Total Pop by Hispanic	#	% of Total		Hispanic (P1 - P2)	% of Total
Not Hispanic or Latino:	4,335,208	93%		322,549	7%
Black or African American alone	1,452,420	31%		11,603	0%
White; Black or African American	41,902	1%		1,729	0%
Black or African American; American Indian and Alaska Native	6,931	0%		401	0%
Black or African American; Asian	2,185	0%		138	0%
Black or African American; Native Hawaiian and Other Pacific Islander	371	0%		48	0%
Black or African American; Some Other Race	6,202	0%		7,103	0%
White; Black or African American; American Indian and Alaska Native	4,341	0%		614	0%
White; Black or African American; Asian	886	0%		99	0%
White; Black or African American; Native Hawaiian and Other Pacific Islander	112	0%		9	0%
White; Black or African American; Some Other Race	1,525	0%		1,470	0%
Black or African American; American Indian and Alaska Native; Asian	119	0%		18	0%
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	36	0%		4	0%
Black or African American; American Indian and Alaska Native; Some Other Race	230	0%		144	0%
Black or African American; Asian; Native Hawaiian and Other Pacific Islander	136	0%		34	0%
Black or African American; Asian; Some Other Race	74	0%		54	0%
Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	20	0%		26	0%
White; Black or African American; American Indian and Alaska Native; Asian	253	0%		86	0%
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	37	0%		9	0%
White; Black or African American; American Indian and Alaska Native; Some Other Race	450	0%		800	0%
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander	49	0%		15	0%
White; Black or African American; Asian; Some Other Race	32	0%		35	0%
White; Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	16	0%		14	0%
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	26	0%		12	0%
Black or African American; American Indian and Alaska Native; Asian; Some Other Race	18	0%		3	0%
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0%		1	0%
Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	41	0%		6	0%
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	51	0%		31	0%
White; Black or African American; American Indian and Alaska Native; Asian; Some Other Race	48	0%		47	0%
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	1	0%		2	0%
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	7	0%		4	0%
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	8	0%		0	0%
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	20	0%		13	0%
Black Alone or In Combination, non-Hispanic and Hispanic	1,518,547			24,572	

Appendix 2 Detailed Place Splits Analysis

A. HB1 / SB5 Enrolled Plan Place Splits

Place Name	District	Total	Total %	white	white %	Black	Black %
Addis town	2	6,700	99.54%	3,415	99.74%	2,765	99.42%
	6	31	0.46%	9	0.26%	16	0.58%
Arnaudville town	3	39	3.87%	29	3.43%	5	3.79%
	4	970	96.13%	816	96.57%	127	96.21%
Baker city	2	3,119	25.04%	535	32.00%	2,509	24.12%
	6	9,336	74.96%	1,137	68.00%	7,893	75.88%
Basile town	3	0	0.00%	0	0.00%	0	0.00%
	4	1,214	100.00%	839	100.00%	275	100.00%
Baton Rouge city	2	79,011	34.73%	4,209	5.41%	72,143	57.21%
	6	148,459	65.27%	73,620	94.59%	53,954	42.79%
Brusly town	2	694	26.92%	398	22.26%	263	42.76%
	6	1,884	73.08%	1,390	77.74%	352	57.24%
Downsville village	4	96	80.00%	81	80.20%	1	100.00%
	5	24	20.00%	20	19.80%	0	0.00%
Eunice city	3	302	3.21%	252	4.63%	31	0.88%
	4	9,120	96.79%	5,196	95.37%	3,487	99.12%
Gonzales city	2	5,972	48.83%	1,629	36.76%	3,674	61.30%
	6	6,259	51.17%	2,803	63.24%	2,319	38.70%
Hammond city	1	3,001	15.32%	1,656	19.29%	1,074	11.58%
	5	16,583	84.68%	6,928	80.71%	8,202	88.42%
Houma city	1	31,448	94.14%	18,120	93.13%	8,428	96.19%
	6	1,958	5.86%	1,336	6.87%	334	3.81%
Kenner city	1	52,353	78.79%	24,540	92.30%	8,513	53.80%
	2	14,095	21.21%	2,046	7.70%	7,311	46.20%
Morgan City city	3	10,449	91.08%	5,855	88.18%	2,696	97.47%
	6	1,023	8.92%	785	11.82%	70	2.53%
New Orleans city	1	48,050	12.51%	36,600	30.15%	3,973	1.81%
	2	335,947	87.49%	84,785	69.85%	214,996	98.19%
Patterson city	3	4,325	72.92%	1,846	67.37%	2,166	80.70%
	6	1,606	27.08%	894	32.63%	518	19.30%
Plaquemine city	2	6,159	98.25%	2,792	97.15%	3,041	99.22%
	6	110	1.75%	82	2.85%	24	0.78%
Ponchatoula city	1	7,647	97.76%	4,684	97.60%	2,339	98.32%
	5	175	2.24%	115	2.40%	40	1.68%
Port Allen city	2	4,315	87.37%	1,327	79.94%	2,812	91.81%
	6	624	12.63%	333	20.06%	251	8.19%
White Castle town	2	1,722	100.00%	125	100.00%	1,572	100.00%
	6	0	0.00%	0	0.00%	0	0.00%

B. Robinson Illustrative Plan Place Splits

Place Name	District	Total	Total %	white	white %	Black	Black %
Alexandria city	3	13,740	30.35%	9,302	56.25%	2,796	10.87%
	5	31,535	69.65%	7,235	43.75%	22,935	89.13%
Baton Rouge city	2	34,805	15.30%	15,737	20.22%	14,148	11.22%
	5	101,118	44.45%	8,671	11.14%	86,314	68.45%
	6	91,547	40.25%	53,421	68.64%	25,635	20.33%
Breaux Bridge city	3	5,165	68.75%	3,128	86.19%	1,718	49.25%
	5	2,348	31.25%	501	13.81%	1,770	50.75%
Central city	5	2,135	7.22%	1,884	8.07%	119	3.20%
	6	27,430	92.78%	21,450	91.93%	3,604	96.80%
Eunice city	3	302	3.21%	252	4.63%	31	0.88%
	5	9,120	96.79%	5,196	95.37%	3,487	99.12%
Gonzales city	2	12,209	99.82%	4,418	99.68%	5,989	99.93%
	6	22	0.18%	14	0.32%	4	0.07%
Independence town	5	1,619	99.02%	718	98.09%	796	100.00%
	6	16	0.98%	14	1.91%	0	0.00%
Kenner city	1	54,578	82.14%	24,616	92.59%	9,187	58.06%
	2	11,870	17.86%	1,970	7.41%	6,637	41.94%
Lafayette city	3	84,924	69.97%	60,719	87.85%	13,028	33.10%
	5	36,450	30.03%	8,398	12.15%	26,326	66.90%
Leesville city	3	1,979	35.03%	1,047	39.78%	625	29.12%
	4	3,670	64.97%	1,585	60.22%	1,521	70.88%
Monroe city	4	10,565	22.15%	8,456	58.73%	1,370	4.41%
	5	37,137	77.85%	5,942	41.27%	29,687	95.59%
New Iberia city	1	28,033	98.17%	12,460	98.13%	13,099	98.56%
	3	522	1.83%	237	1.87%	191	1.44%
New Llano town	3	634	28.65%	273	32.62%	233	24.66%
	4	1,579	71.35%	564	67.38%	712	75.34%
New Orleans city	1	75,419	19.64%	55,537	45.75%	8,578	3.92%
	2	308,578	80.36%	65,848	54.25%	210,391	96.08%
Pineville city	3	4,753	33.04%	3,376	42.13%	846	16.48%
	5	9,631	66.96%	4,637	57.87%	4,287	83.52%
Plaquemine city	1	110	1.75%	82	2.85%	24	0.78%
	5	6,159	98.25%	2,792	97.15%	3,041	99.22%
Scott city	3	7,224	88.98%	4,955	88.70%	1,287	88.27%
	5	895	11.02%	631	11.30%	171	11.73%
Slidell city	1	28,664	99.59%	17,336	99.64%	7,593	99.50%
	6	117	0.41%	62	0.36%	38	0.50%
Ville Platte city	3	962	15.26%	730	39.16%	190	4.44%
	5	5,341	84.74%	1,134	60.84%	4,092	95.56%
West Monroe city	4	7,824	59.71%	5,508	77.77%	1,616	32.97%
	5	5,279	40.29%	1,574	22.23%	3,285	67.03%
White Castle town	1	0	0.00%	0	0.00%	0	0.00%
	2	1,722	100.00%	125	100.00%	1,572	100.00%

C. Galmon Illustrative 1 Plan Place Splits

Place Name	District	Total	Total %	white	white %	Black	Black %
Alexandria city	4	16,205	35.79%	10,837	65.53%	3,525	13.70%
	5	29,070	64.21%	5,700	34.47%	22,206	86.30%
Arnaudville town	1	39	3.87%	29	3.43%	5	3.79%
	5	970	96.13%	816	96.57%	127	96.21%
Ball town	4	0	0.00%	0	0.00%	0	0.00%
	5	3,961	100.00%	3,058	100.00%	522	100.00%
Baton Rouge city	5	143,972	63.29%	25,896	33.27%	105,549	83.70%
	6	83,498	36.71%	51,933	66.73%	20,548	16.30%
Broussard city	1	190	1.42%	153	1.57%	25	1.06%
	3	13,227	98.58%	9,617	98.43%	2,323	98.94%
Eunice city	3	302	3.21%	252	4.63%	31	0.88%
	5	9,120	96.79%	5,196	95.37%	3,487	99.12%
Kenner city	1	56,858	85.57%	25,661	96.52%	9,803	61.95%
	2	9,590	14.43%	925	3.48%	6,021	38.05%
Lafayette city	3	84,954	69.99%	60,738	87.88%	13,036	33.12%
	5	36,420	30.01%	8,379	12.12%	26,318	66.88%
Mandeville city	1	5,043	38.23%	4,000	37.54%	352	49.79%
	6	8,149	61.77%	6,654	62.46%	355	50.21%
Morgan City city	1	0	0.00%	0	0.00%	0	0.00%
	3	11,472	100.00%	6,640	100.00%	2,766	100.00%
New Iberia city	1	27,435	96.08%	11,971	94.28%	13,024	98.00%
	3	1,120	3.92%	726	5.72%	266	2.00%
New Orleans city	1	33,047	8.61%	25,500	21.01%	2,459	1.12%
	2	350,950	91.39%	95,885	78.99%	216,510	98.88%
West Monroe city	4	8,395	64.07%	5,879	83.01%	1,769	36.09%
	5	4,708	35.93%	1,203	16.99%	3,132	63.91%

D. Galmon Illustrative 2 Plan Place Splits

Place Name	District	Total	Total %	white	white %	Black	Black %
Alexandria city	4	15,160	33.48%	10,204	61.70%	3,220	12.51%
	5	30,115	66.52%	6,333	38.30%	22,511	87.49%
Arnaudville town	2	39	3.87%	29	3.43%	5	3.79%
	5	970	96.13%	816	96.57%	127	96.21%
Baton Rouge city	5	130,936	57.56%	17,643	22.67%	102,087	80.96%
	6	96,534	42.44%	60,186	77.33%	24,010	19.04%
Broussard city	2	190	1.42%	153	1.57%	25	1.06%
	3	13,227	98.58%	9,617	98.43%	2,323	98.94%
Carencro city	2	821	8.85%	234	5.85%	476	10.43%
	3	8,451	91.15%	3,768	94.15%	4,088	89.57%
Central city	5	1,266	4.28%	619	2.65%	568	15.26%
	6	28,299	95.72%	22,715	97.35%	3,155	84.74%
DeRidder city	3	9,198	93.36%	5,086	94.03%	3,147	93.13%
	4	654	6.64%	323	5.97%	232	6.87%
Eunice city	3	302	3.21%	252	4.63%	31	0.88%
	5	9,120	96.79%	5,196	95.37%	3,487	99.12%
Forest Hill village	4	605	100.00%	346	100.00%	17	100.00%
	5	0	0.00%	0	0.00%	0	0.00%
Lafayette city	2	38,408	31.64%	10,758	15.56%	25,615	65.09%
	3	82,966	68.36%	58,359	84.44%	13,739	34.91%
Monroe city	4	7,734	16.21%	6,448	44.78%	766	2.47%
	5	39,968	83.79%	7,950	55.22%	30,291	97.53%
Morgan City city	1	0	0.00%	0	0.00%	0	0.00%
	2	0	0.00%	0	0.00%	0	0.00%
	3	11,472	100.00%	6,640	100.00%	2,766	100.00%
New Orleans city	1	28,740	7.48%	22,401	18.45%	1,852	0.85%
	2	355,257	92.52%	98,984	81.55%	217,117	99.15%
Pineville city	4	7,724	53.70%	5,155	64.33%	1,759	34.27%
	5	6,660	46.30%	2,858	35.67%	3,374	65.73%
West Monroe city	4	8,264	63.07%	5,785	81.69%	1,737	35.44%
	5	4,839	36.93%	1,297	18.31%	3,164	64.56%
Zachary city	5	19,303	99.93%	9,012	99.93%	9,040	100.00%
	6	13	0.07%	6	0.07%	0	0.00%

E. Galmon Illustrative 3 Plan Place Splits

Place Name	District	Total	Total %	white	white %	Black	Black %
Alexandria city	3	15,163	33.49%	10,207	61.72%	3,217	12.50%
	5	30,112	66.51%	6,330	38.28%	22,514	87.50%
Arnaudville town	1	39	3.87%	29	3.43%	5	3.79%
	5	970	96.13%	816	96.57%	127	96.21%
Baton Rouge city	5	124,663	54.80%	14,103	18.12%	100,237	79.49%
	6	102,807	45.20%	63,726	81.88%	25,860	20.51%
Broussard city	1	190	1.42%	153	1.57%	25	1.06%
	3	13,227	98.58%	9,617	98.43%	2,323	98.94%
Eunice city	3	302	3.21%	252	4.63%	31	0.88%
	5	9,120	96.79%	5,196	95.37%	3,487	99.12%
Kenner city	1	56,858	85.57%	25,661	96.52%	9,803	61.95%
	2	9,590	14.43%	925	3.48%	6,021	38.05%
Lafayette city	3	84,924	69.97%	60,719	87.85%	13,028	33%
	5	36,450	30.03%	8,398	12.15%	26,326	67%
Mandeville city	1	13,192	100.00%	10,654	100.00%	707	100.00%
	6	0	0.00%	0	0.00%	0	0.00%
Monroe city	4	10,521	22.06%	7,972	55.37%	1,745	5.62%
	5	37,181	77.94%	6,426	44.63%	29,312	94.38%
New Iberia city	1	27,148	95.07%	11,810	93.01%	12,939	97.36%
	3	1,407	4.93%	887	6.99%	351	2.64%
New Orleans city	1	33,047	8.61%	25,500	21.01%	2,459	1.12%
	2	350,950	91.39%	95,885	78.99%	216,510	98.88%
Pineville city	3	8,141	56.60%	5,240	65.39%	2,162	42.12%
	5	6,243	43.40%	2,773	34.61%	2,971	57.88%
Scott city	3	7,224	88.98%	4,955	88.70%	1,287	88.27%
	5	895	11.02%	631	11.30%	171	11.73%
Slidell city	1	0	0.00%	0	0.00%	0	0.00%
	6	28,781	100.00%	17,398	100.00%	7,631	100.00%
Tickfaw village	5	0	0.00%	0	0.00%	0	0.00%
	6	635	100.00%	425	100.00%	121	100.00%
West Monroe city	4	8,828	67.37%	5,940	83.87%	2,095	42.75%
	5	4,275	32.63%	1,142	16.13%	2,806	57.25%

Appendix 3 Detailed Parish Splits Analysis

A. HB1 / SB5 Enrolled Parish Splits

Parish Name	District	Total	Total %	white	white %	Black	Black %
Ascension Parish	2	20,892	16.52%	5,452	6.85%	13,842	42.97%
	6	105,608	83.48%	74,193	93.15%	18,374	57.03%
Assumption Parish	2	6,710	31.89%	2,838	20.90%	3,622	58.23%
	6	14,329	68.11%	10,742	79.10%	2,598	41.77%
East Baton Rouge Parish	2	94,325	20.65%	5,351	2.80%	85,793	40.20%
	6	362,456	79.35%	186,004	97.20%	127,605	59.80%
Grant Parish	4	7,473	33.71%	5,567	33.38%	1,563	46.87%
	5	14,696	66.29%	11,111	66.62%	1,772	53.13%
Iberville Parish	2	21,073	69.68%	8,306	56.77%	11,316	82.42%
	6	9,168	30.32%	6,326	43.23%	2,414	17.58%
Jefferson Parish	1	245,132	55.61%	149,694	71.84%	32,307	25.60%
	2	195,649	44.39%	58,691	28.16%	93,910	74.40%
Lafourche Parish	1	43,701	44.80%	34,951	49.42%	1,903	12.00%
	6	53,856	55.20%	35,771	50.58%	13,952	88.00%
Orleans Parish	1	48,050	12.51%	36,600	30.15%	3,973	1.81%
	2	335,947	87.49%	84,785	69.85%	214,996	98.19%
St. Charles Parish	2	34,943	66.50%	20,529	62.76%	11,091	79.63%
	6	17,606	33.50%	12,179	37.24%	2,837	20.37%
St. John the Baptist Parish	2	32,678	76.93%	8,484	63.56%	21,557	85.56%
	6	9,799	23.07%	4,864	36.44%	3,639	14.44%
St. Martin Parish	3	50,399	97.36%	31,649	96.14%	15,908	99.92%
	6	1,368	2.64%	1,270	3.86%	13	0.08%
St. Mary Parish	3	44,607	90.29%	24,046	91.31%	15,198	95.04%
	6	4,799	9.71%	2,288	8.69%	793	4.96%
Tangipahoa Parish	1	39,681	29.80%	28,681	35.93%	7,152	17.08%
	5	93,476	70.20%	51,144	64.07%	34,727	82.92%
Terrebonne Parish	1	67,855	61.92%	41,238	59.94%	14,123	61.01%
	6	41,725	38.08%	27,564	40.06%	9,024	38.99%
West Baton Rouge Parish	2	13,908	51.13%	5,642	39.97%	7,347	65.77%
	6	13,291	48.87%	8,472	60.03%	3,823	34.23%

B. Robinson Illustrative Plan Parish Splits

Parish Name	District	Total	Total %	white	white %	Black	Black %
Ascension Parish	2	38,845	30.71%	15,739	19.76%	19,119	59.35%
	6	87,655	69.29%	63,906	80.24%	13,097	40.65%
East Baton Rouge Parish	2	78,676	17.22%	38,120	19.92%	27,030	12.67%
	5	177,263	38.81%	31,001	16.20%	136,262	63.85%
	6	200,842	43.97%	122,234	63.88%	50,106	23.48%
Evangeline Parish	3	23,988	74.15%	18,390	86.90%	3,854	41.73%
	5	8,362	25.85%	2,772	13.10%	5,381	58.27%
Iberia Parish	1	57,438	82.14%	30,224	78.36%	22,346	91.00%
	3	12,491	17.86%	8,348	21.64%	2,210	9.00%
Iberville Parish	1	5,187	17.15%	4,001	27.34%	886	6.45%
	2	10,224	33.81%	3,777	25.81%	5,529	40.27%
	5	14,830	49.04%	6,854	46.84%	7,315	53.28%
Jefferson Parish	1	237,070	53.78%	143,738	68.98%	30,464	24.14%
	2	203,711	46.22%	64,647	31.02%	95,753	75.86%
Lafayette Parish	3	172,780	71.47%	125,084	83.13%	26,466	40.63%
	5	68,973	28.53%	25,391	16.87%	38,670	59.37%
Orleans Parish	1	75,419	19.64%	55,537	45.75%	8,578	3.92%
	2	308,578	80.36%	65,848	54.25%	210,391	96.08%
Ouachita Parish	4	90,953	56.72%	72,160	82.54%	11,272	18.41%
	5	69,415	43.28%	15,266	17.46%	49,945	81.59%
Rapides Parish	3	69,584	53.52%	53,437	70.01%	8,596	20.18%
	5	60,439	46.48%	22,886	29.99%	33,996	79.82%
St. Martin Parish	1	1,368	2.64%	1,270	3.86%	13	0.08%
	3	35,420	68.42%	22,773	69.18%	10,468	65.75%
	5	14,979	28.94%	8,876	26.96%	5,440	34.17%
St. Tammany Parish	1	75,982	28.72%	44,884	23.36%	21,121	54.66%
	6	188,588	71.28%	147,260	76.64%	17,522	45.34%
Tangipahoa Parish	5	21,608	16.30%	9,297	11.65%	11,351	27.10%
	6	111,459	83.70%	70,528	88.35%	30,528	72.90%
Vernon Parish	3	33,131	67.96%	22,486	66.92%	4,986	65.51%
	4	15,619	32.04%	11,113	33.08%	2,625	34.49%

C. Galmon Illustrative 1 Plan Parish Splits

Parish Name	District	Total	Total %	white	white %	Black	Black %
Ascension Parish	2	48,562	38.39%	22,545	28.31%	20,750	64.41%
	6	77,938	61.61%	57,100	71.69%	11,466	35.59%
East Baton Rouge Parish	5	221,639	48.52%	45,966	24.02%	157,991	74.04%
	6	235,142	51.48%	145,389	75.98%	55,407	25.96%
Iberia Parish	1	37,106	53.06%	19,198	49.77%	14,793	60.24%
	3	32,823	46.94%	19,374	50.23%	9,763	39.76%
Jefferson Parish	1	236,658	53.69%	143,244	68.74%	30,583	24.23%
	2	204,123	46.31%	65,141	31.26%	95,634	75.77%
Lafayette Parish	3	176,829	73.14%	126,139	83.83%	28,505	43.76%
	5	64,924	26.86%	24,336	16.17%	36,631	56.24%
Orleans Parish	1	33,047	8.61%	25,500	21.01%	2,459	1.12%
	2	350,950	91.39%	95,885	78.99%	216,510	98.88%
Ouachita Parish	4	65,317	40.73%	53,190	60.84%	6,327	10.34%
	5	95,051	59.27%	34,236	39.16%	54,890	89.66%
Rapides Parish	4	48,517	37.31%	35,732	46.82%	7,350	17.26%
	5	81,506	62.69%	40,591	53.18%	35,242	82.74%
Sabine Parish	3	7,249	32.72%	5,842	39.34%	521	13.49%
	4	14,906	67.28%	9,008	60.66%	3,340	86.51%
St. Tammany Parish	1	122,259	46.21%	77,744	40.46%	28,640	74.11%
	6	142,311	53.79%	114,400	59.54%	10,003	25.89%

D. Galmon Illustrative 2 Plan Parish Splits

Parish Name	District	Total	Total %	white	white %	Black	Black %
Ascension Parish	2	9,737	7.70%	2,377	2.98%	6,971	21.64%
	6	116,763	92.30%	77,268	97.02%	25,245	78.36%
Beauregard Parish	3	32,682	89.42%	25,880	89.12%	4,305	92.60%
	4	3,867	10.58%	3,159	10.88%	344	7.40%
East Baton Rouge Parish	5	210,418	46.07%	38,523	20.13%	155,305	72.78%
	6	246,363	53.93%	152,832	79.87%	58,093	27.22%
Jefferson Parish	1	264,196	59.94%	152,348	73.11%	43,262	34.28%
	2	176,585	40.06%	56,037	26.89%	82,955	65.72%
Lafayette Parish	2	41,605	17.21%	12,051	8.01%	27,238	41.82%
	3	200,148	82.79%	138,424	91.99%	37,898	58.18%
Orleans Parish	1	28,740	7.48%	22,401	18.45%	1,852	0.85%
	2	355,257	92.52%	98,984	81.55%	217,117	99.15%
Ouachita Parish	4	72,964	45.50%	59,574	68.14%	7,068	11.55%
	5	87,404	54.50%	27,852	31.86%	54,149	88.45%
Rapides Parish	4	77,658	59.73%	59,498	77.96%	10,114	23.75%
	5	52,365	40.27%	16,825	22.04%	32,478	76.25%
St. Charles Parish	1	25,156	47.87%	15,374	47.00%	6,457	46.36%
	2	27,393	52.13%	17,334	53.00%	7,471	53.64%
St. Mary Parish	1	559	1.13%	216	0.82%	288	1.80%
	3	48,847	98.87%	26,118	99.18%	15,703	98.20%
St. Tammany Parish	1	183,226	69.25%	127,434	66.32%	31,736	82.13%
	6	81,344	30.75%	64,710	33.68%	6,907	17.87%

E. Galmon Illustrative 3 Plan Parish Splits

Parish Name	District	Total	Total %	white	white %	Black	Black %
Ascension Parish	2	48,562	38.39%	22,545	28.31%	20,750	64.41%
	6	77,938	61.61%	57,100	71.69%	11,466	35.59%
East Baton Rouge Parish	5	202,333	44.30%	34,185	17.86%	152,661	71.54%
	6	254,448	55.70%	157,170	82.14%	60,737	28.46%
Iberia Parish	1	48,334	69.12%	24,213	62.77%	20,296	82.65%
	3	21,595	30.88%	14,359	37.23%	4,260	17.35%
Jefferson Parish	1	236,658	53.69%	143,244	68.74%	30,583	24.23%
	2	204,123	46.31%	65,141	31.26%	95,634	75.77%
Lafayette Parish	3	170,269	70.43%	123,202	81.88%	25,986	39.89%
	5	71,484	29.57%	27,273	18.12%	39,150	60.11%
Orleans Parish	1	33,047	8.61%	25,500	21.01%	2,459	1.12%
	2	350,950	91.39%	95,885	78.99%	216,510	98.88%
Ouachita Parish	4	80,956	50.48%	64,061	73.27%	9,924	16.21%
	5	79,412	49.52%	23,365	26.73%	51,293	83.79%
Rapides Parish	3	74,443	57.25%	56,235	73.68%	10,344	24.29%
	5	55,580	42.75%	20,088	26.32%	32,248	75.71%
St. Tammany Parish	1	61,626	23.29%	43,926	22.86%	9,129	23.62%
	6	202,944	76.71%	148,213	77.14%	29,514	76.38%
Tangipahoa Parish	5	79,940	60.03%	38,617	48.38%	34,432	82.22%
	6	53,217	39.97%	41,208	51.62%	7,447	17.78%

Appendix 4 Louisiana Maps

Congressional Plans:

- Louisiana Enrolled HB1 / SB5
- Robinson Illustrative Plan
- Galmon Illustrative 1 Plan
- Galmon Illustrative 2 Plan
- Galmon Illustrative 3 Plan

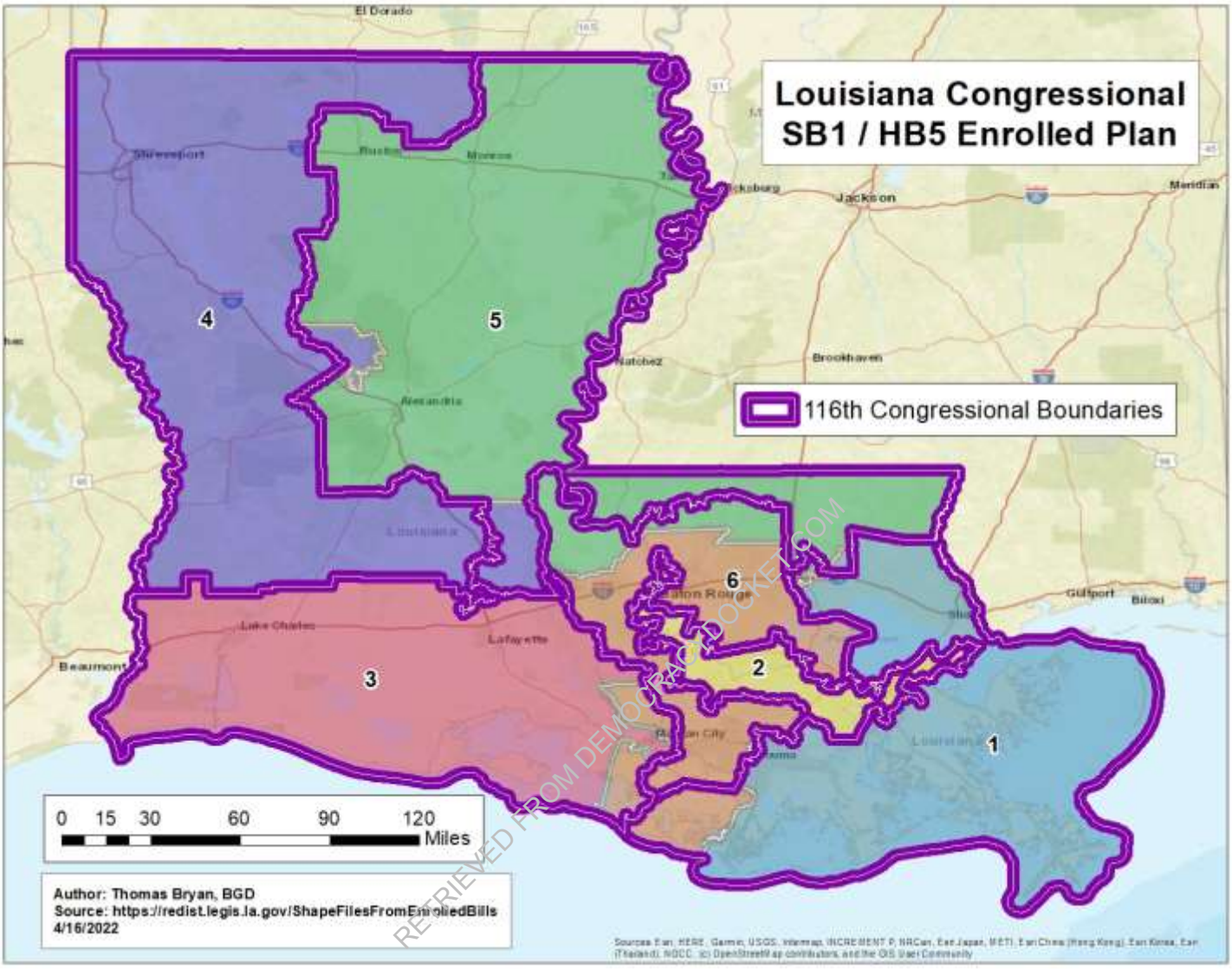
Place Splits by Plan:

- Baton Rouge
- New Orleans
- Lafayette
- Alexandria
- Monroe

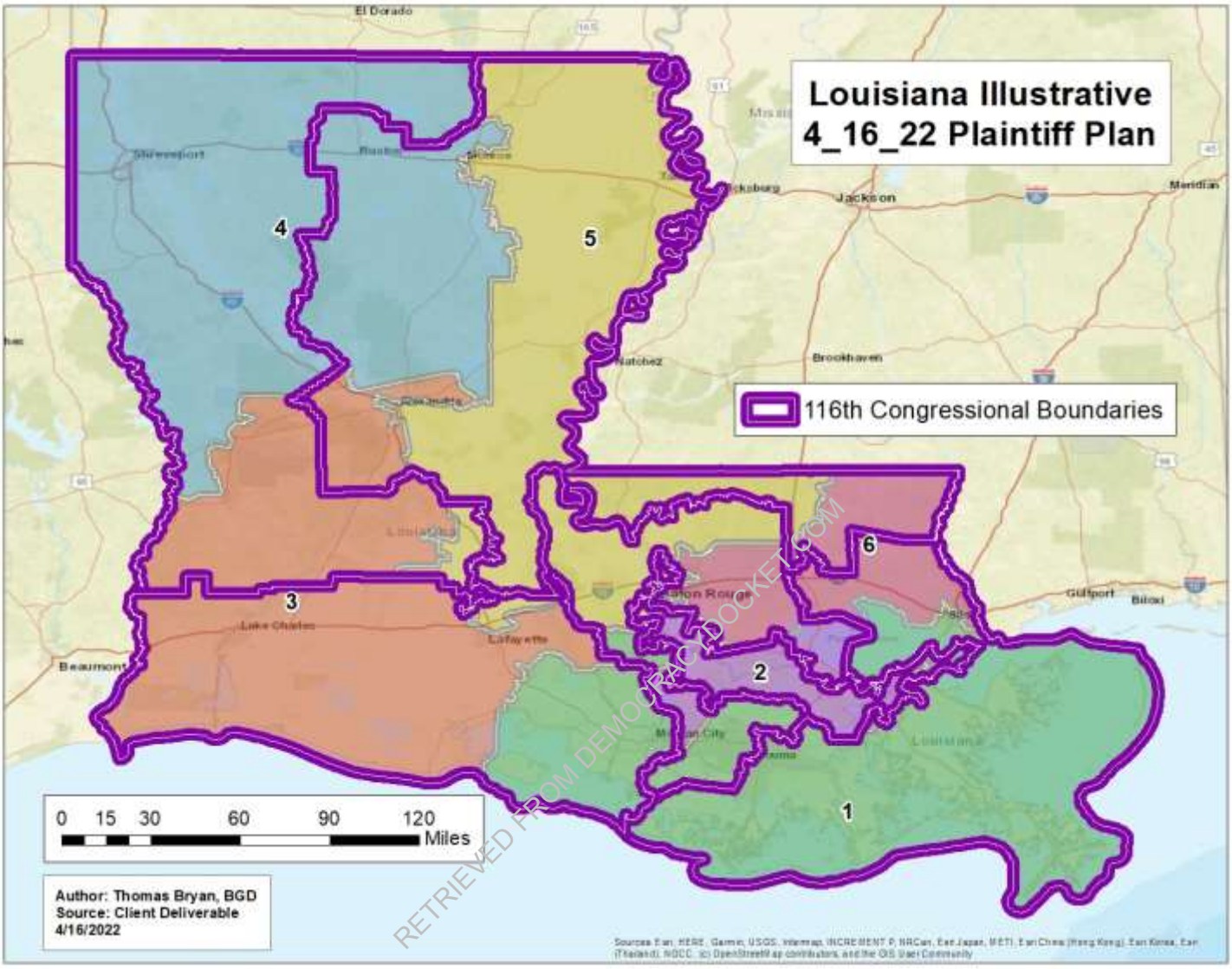
Place Splits by Plan by Race:

- Baton Rouge
- New Orleans
- Lafayette
- Alexandria
- Monroe

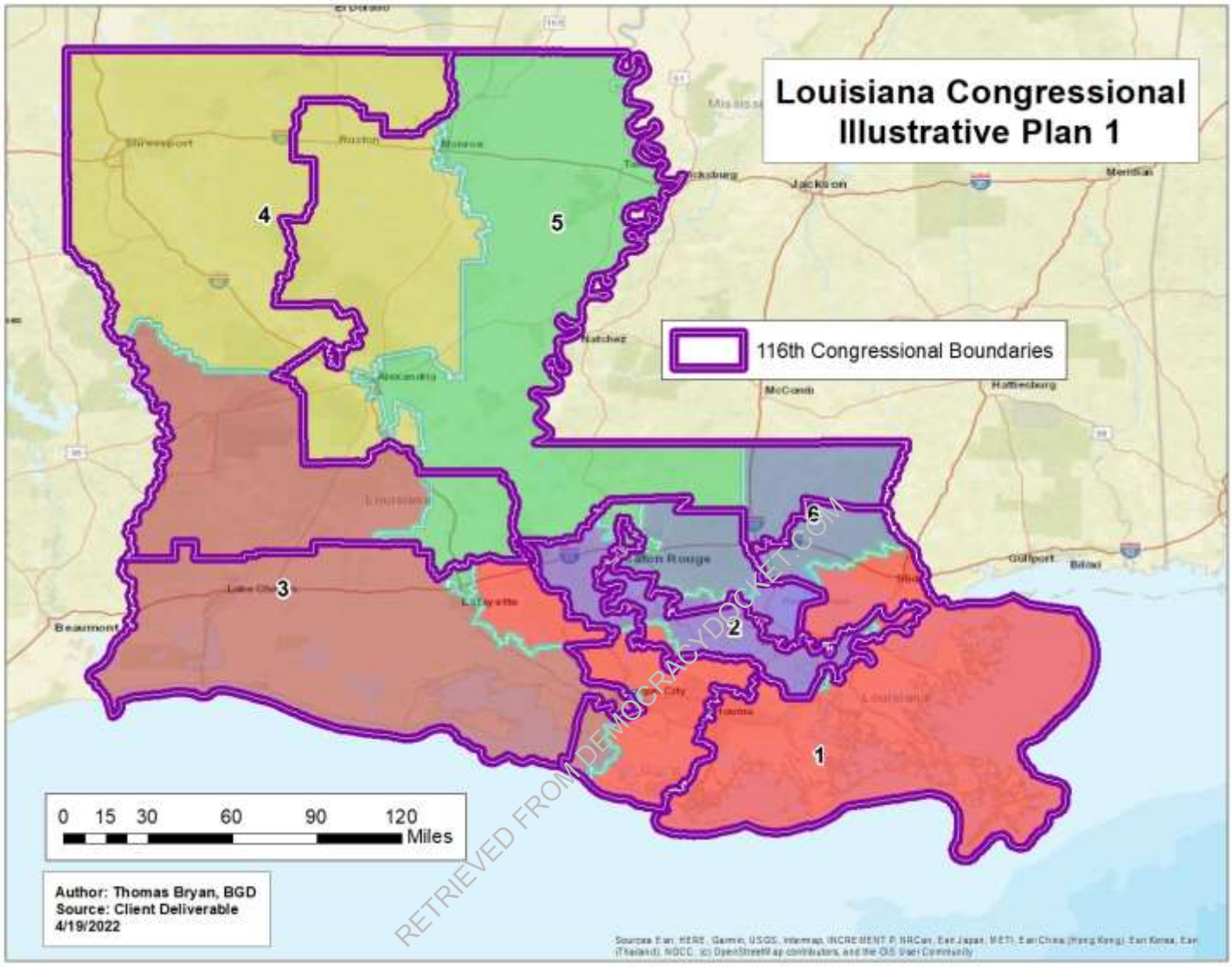
A. Louisiana HB1 / SB5 Enrolled Plan and Existing Plan



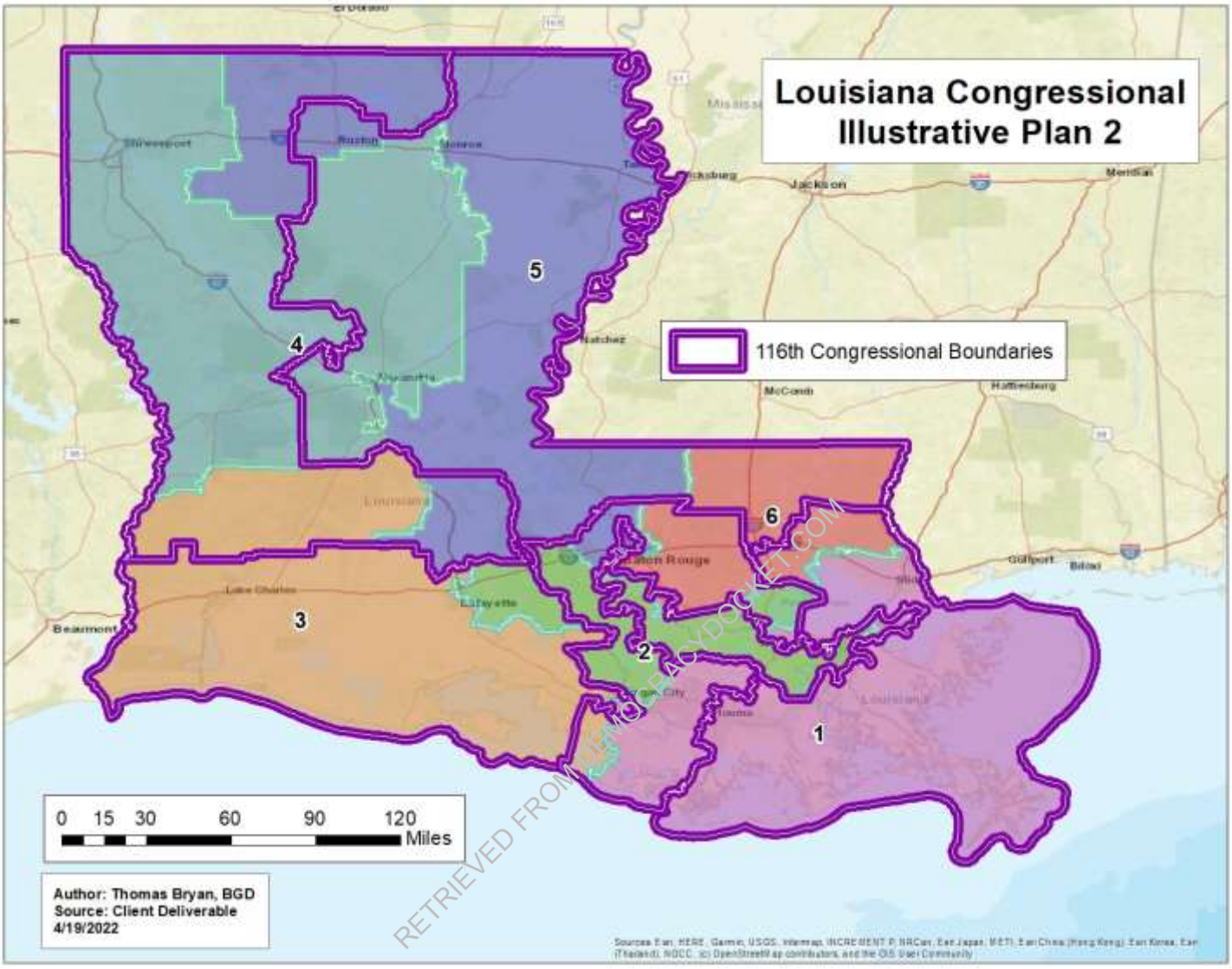
B. Robinson Illustrative Plan and Existing Plan



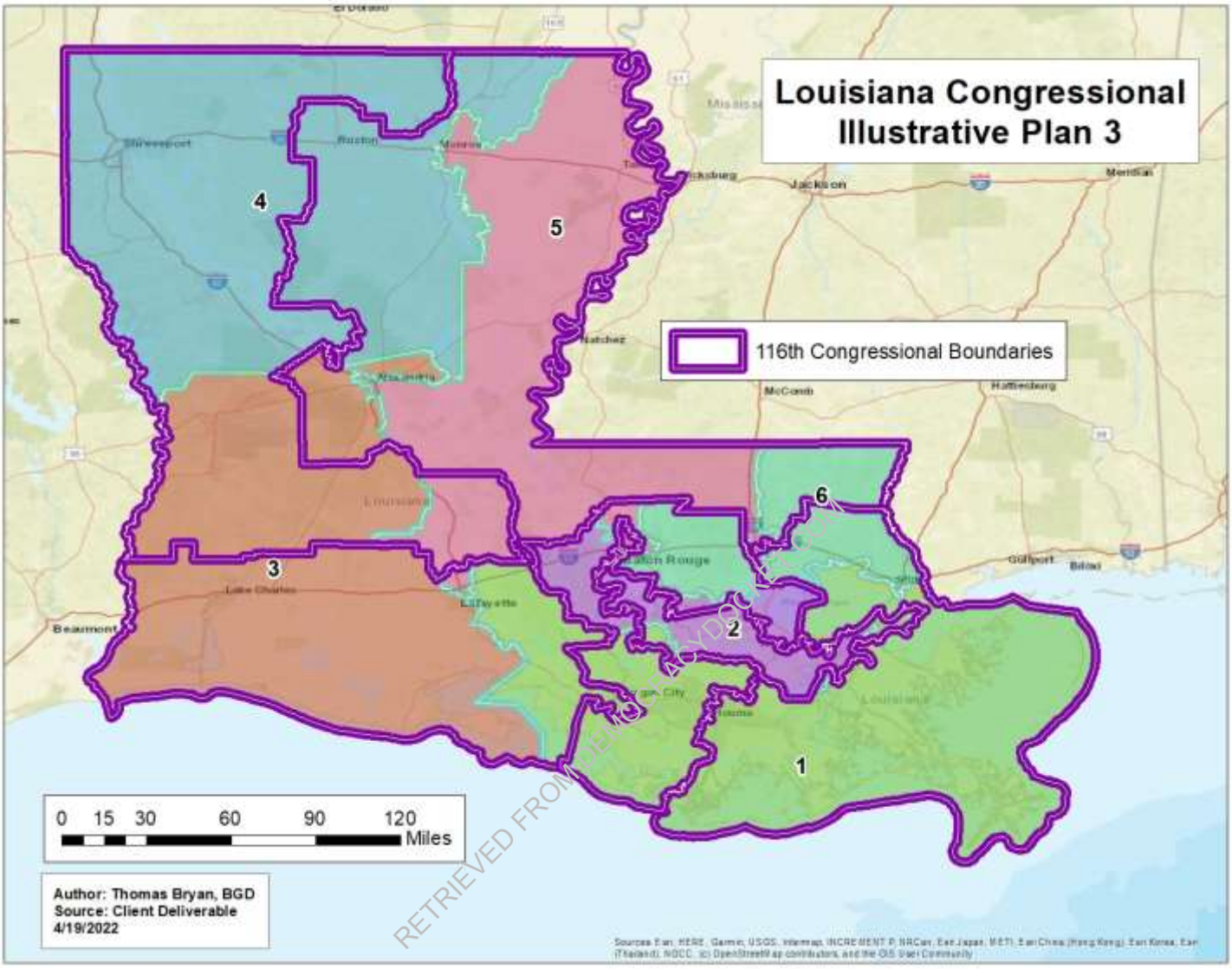
C. Galmon Illustrative 1 Plan and Existing Plan



D. Galmon Illustrative 2 Plan and Existing Plan



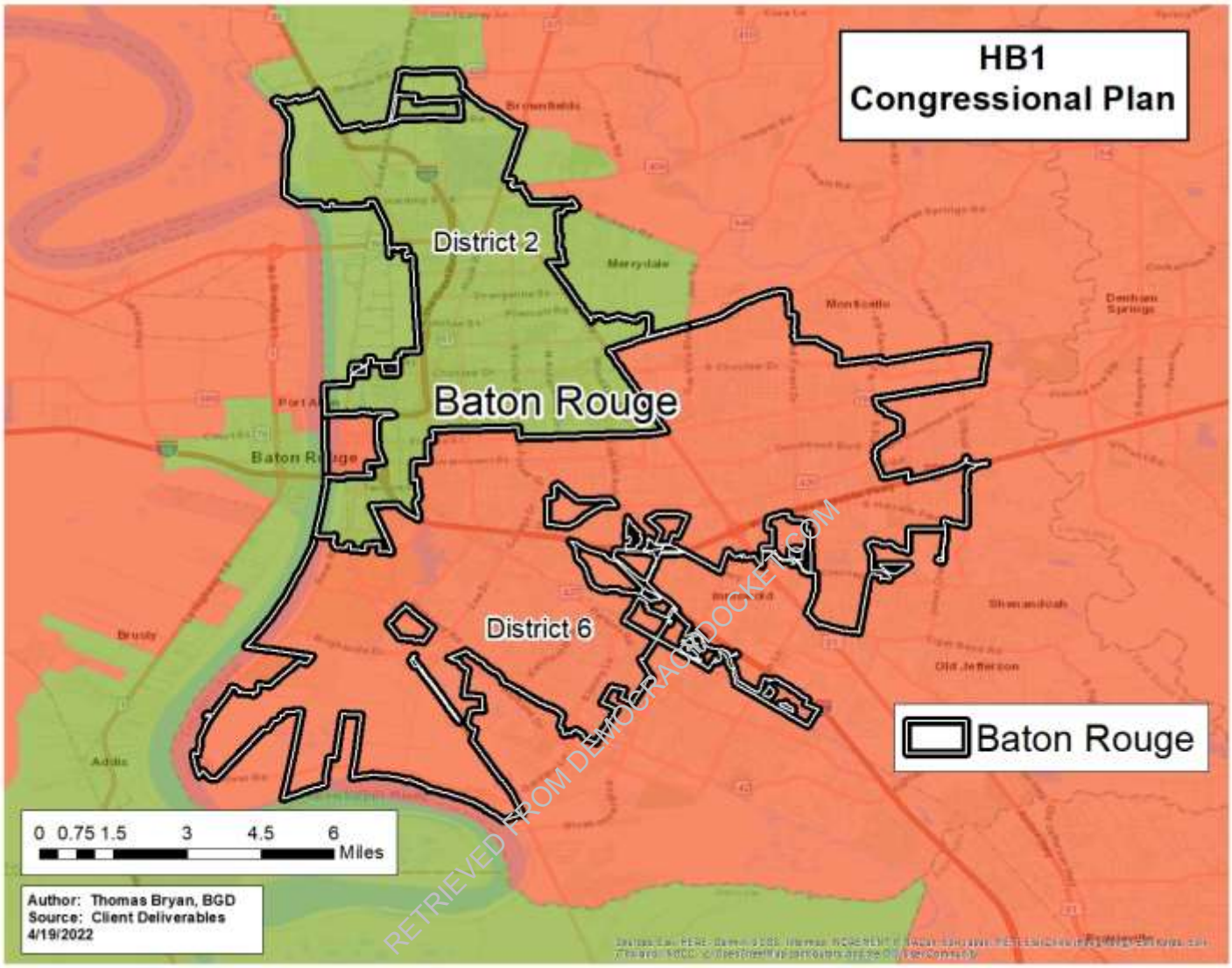
E. Galmon Illustrative 3 Plan and Existing Plan



Baton Rouge

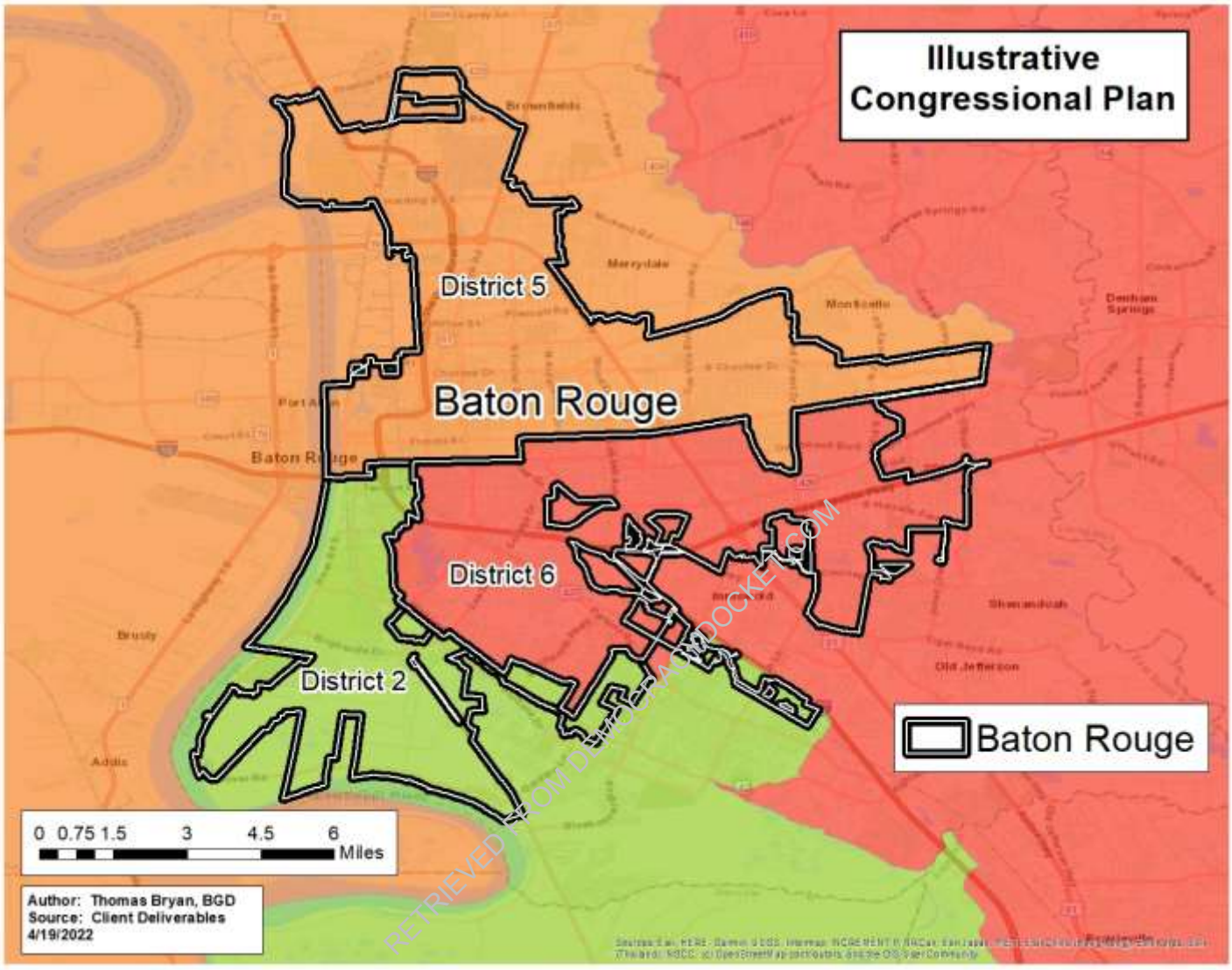
City Splits by Plan

F. Baton Rouge HB1 / SB5 Enrolled Plan Split



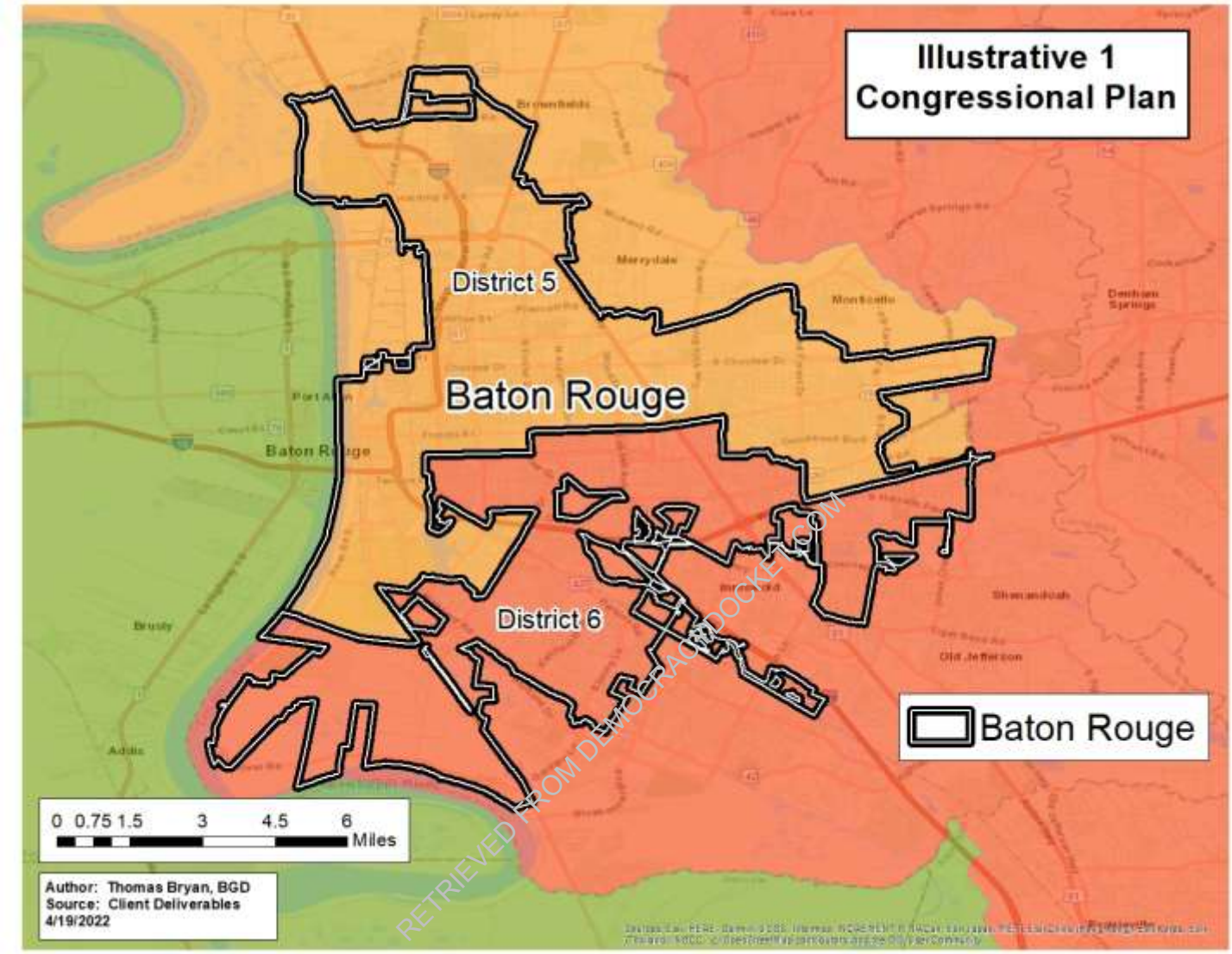
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

G. Baton Rouge Robinson Illustrative Plan Split



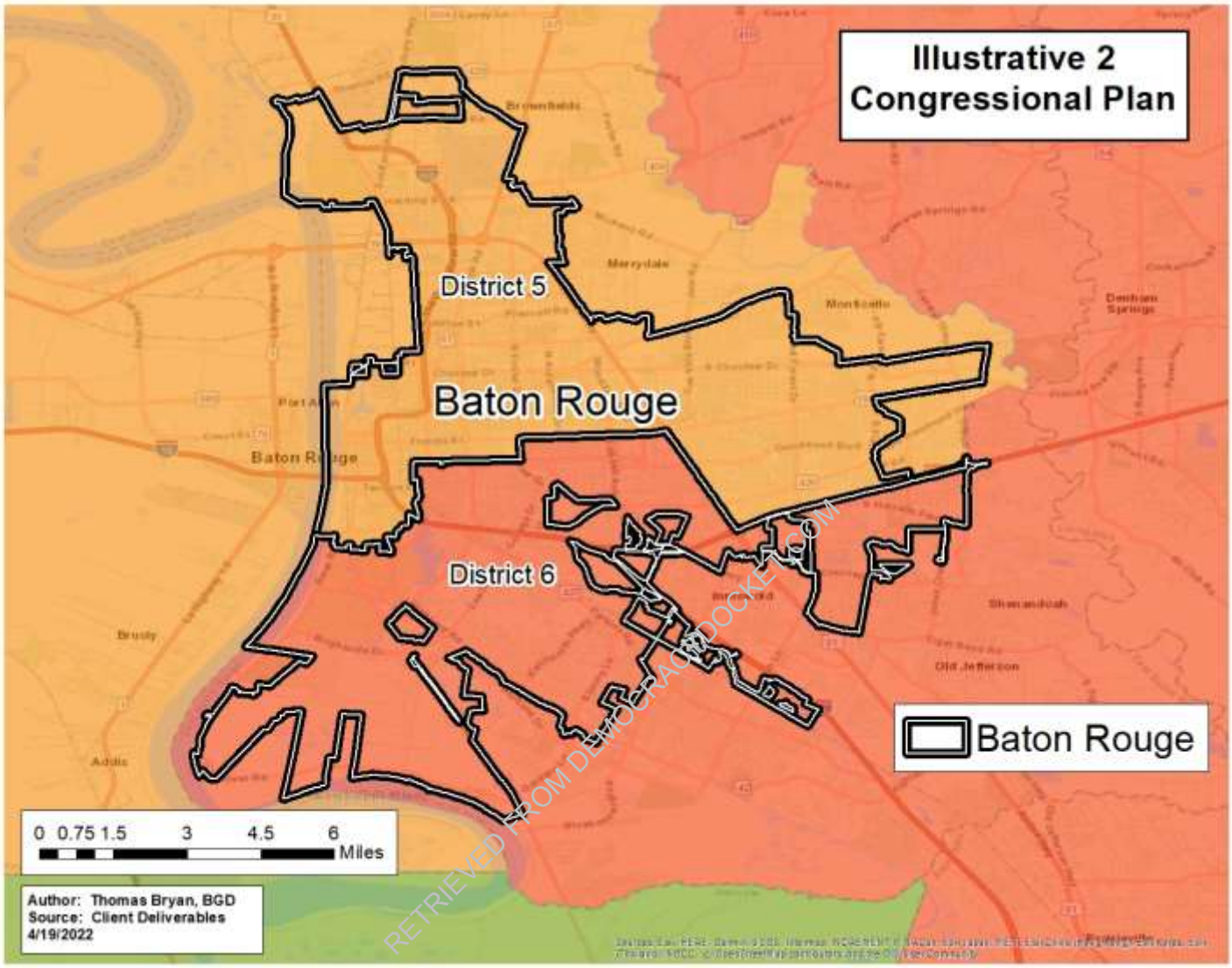
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

H. Baton Rouge Galmon Illustrative 1 Plan Split



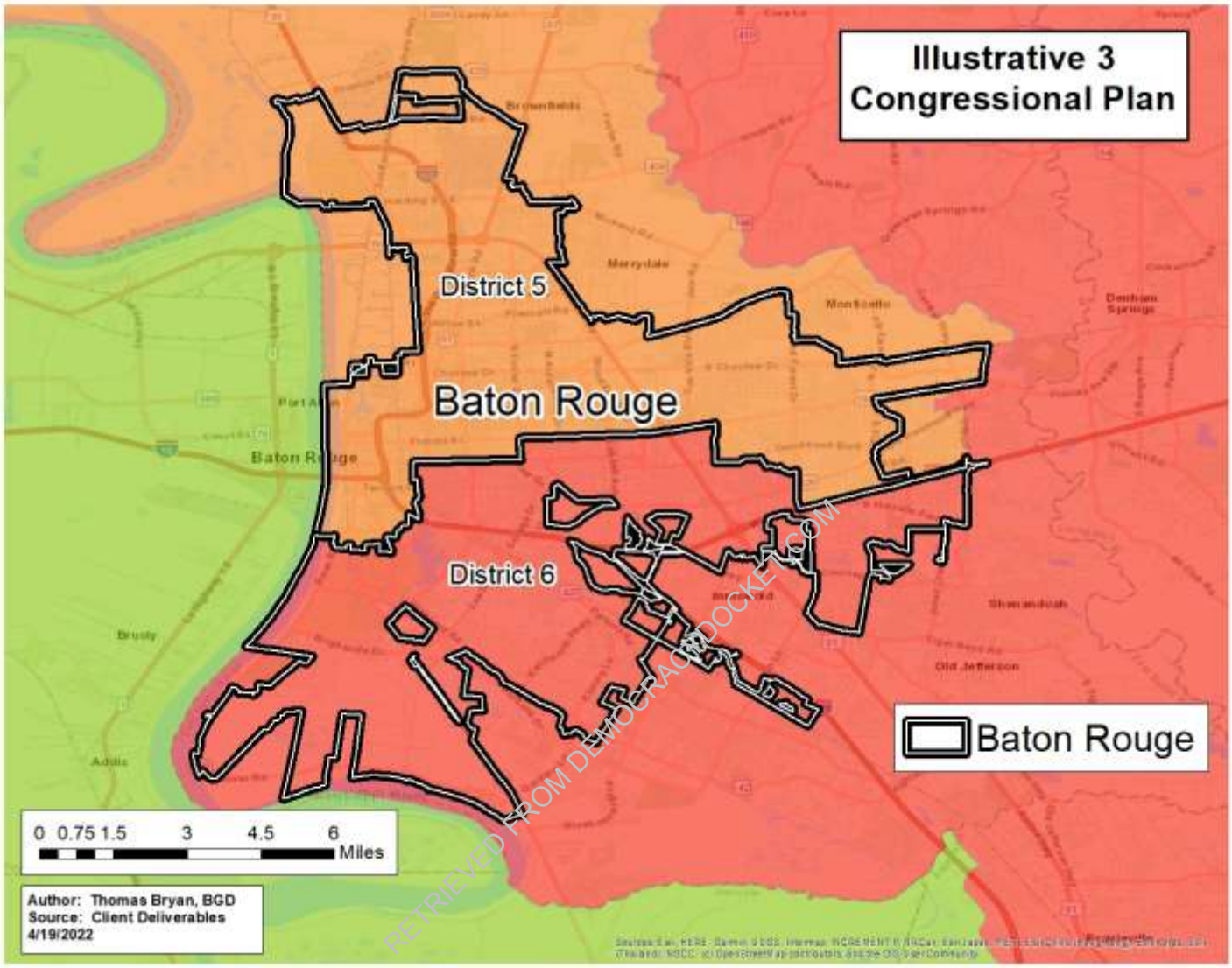
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

I. Baton Rouge Galmon Illustrative 2 Plan Split



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

J. Baton Rouge Galmon Illustrative 3 Plan Split

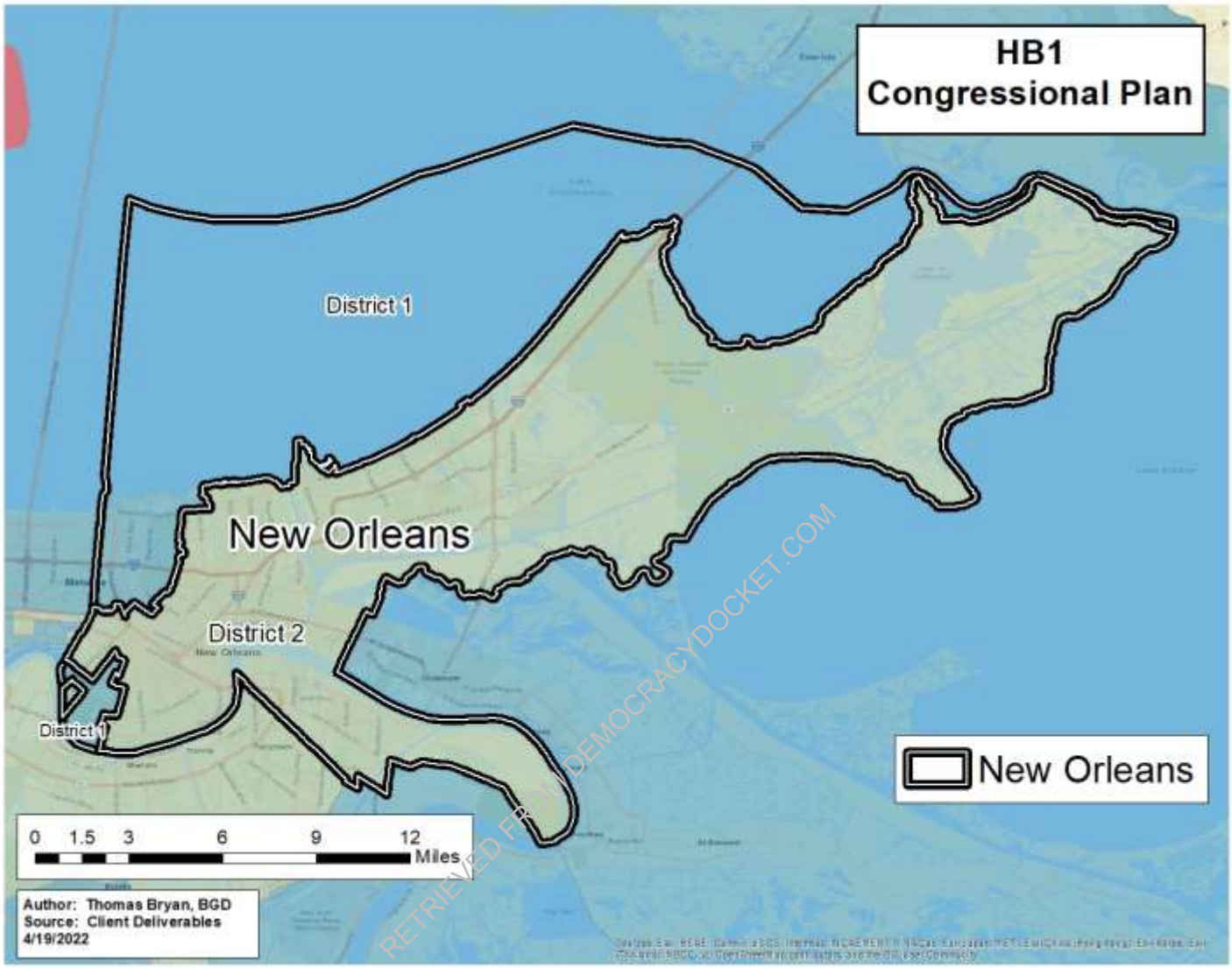


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

New Orleans

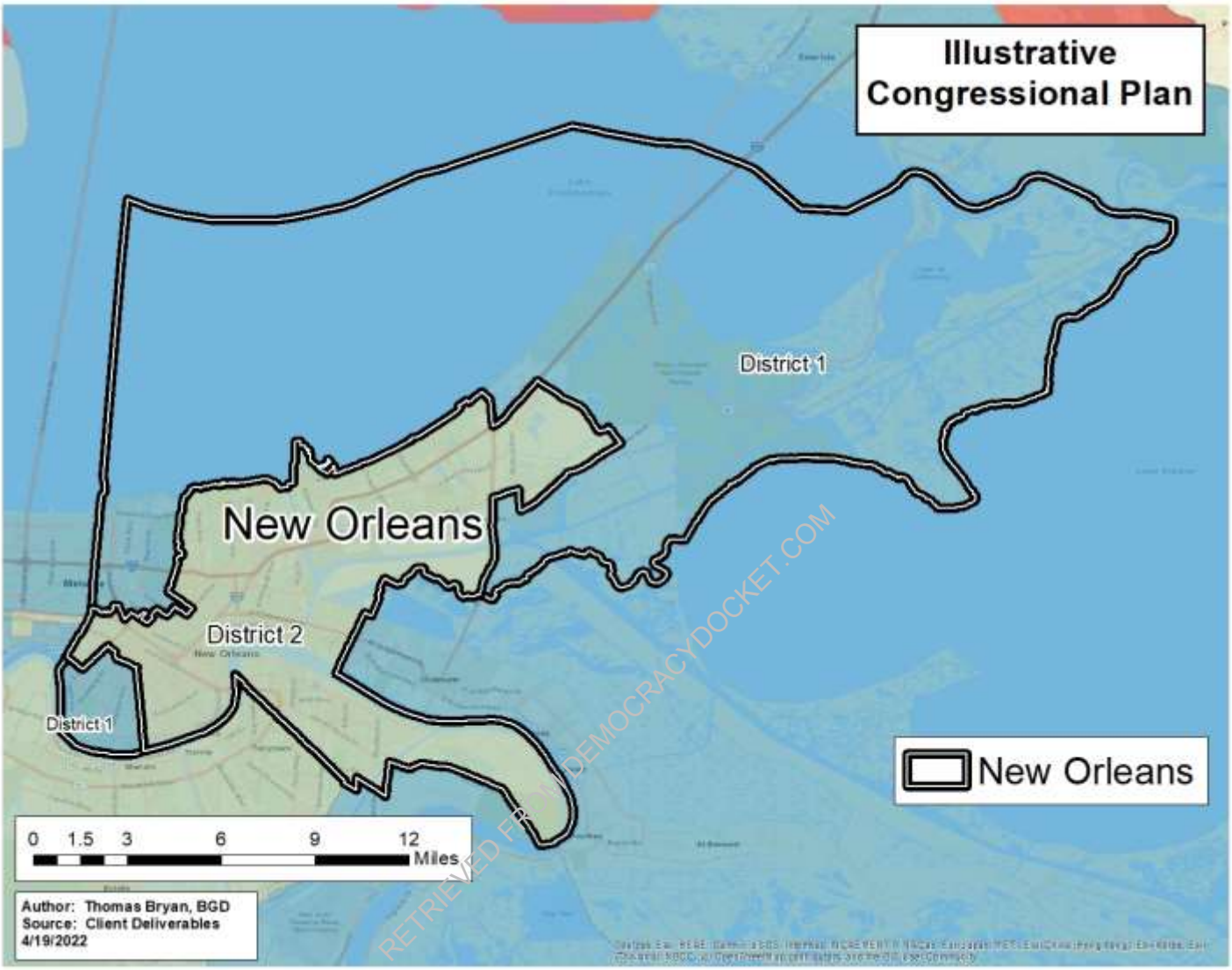
Place Splits by Plan

K. New Orleans HB1 / SB5 Enrolled Plan Split



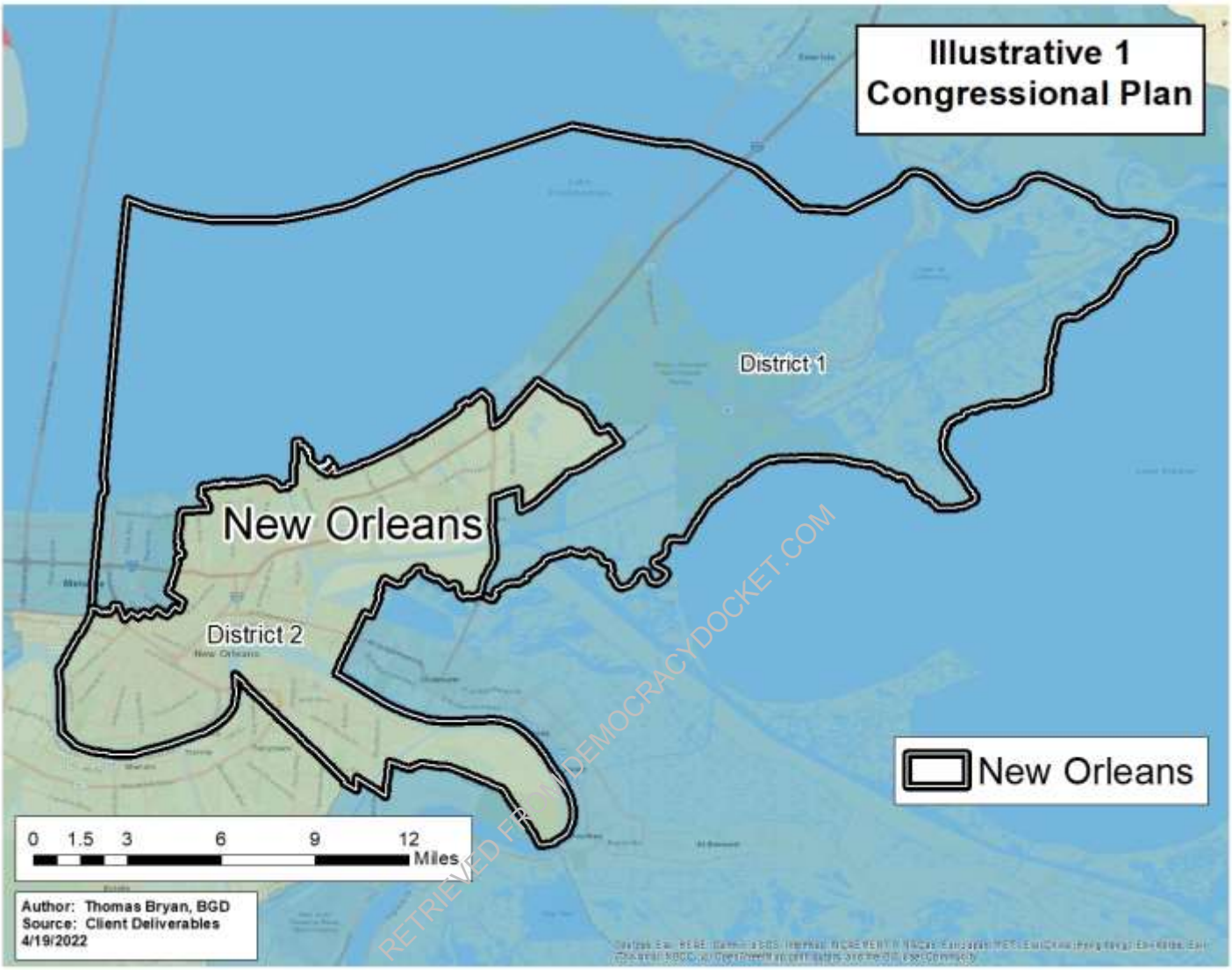
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

L. New Orleans Robinson Illustrative Plan Split



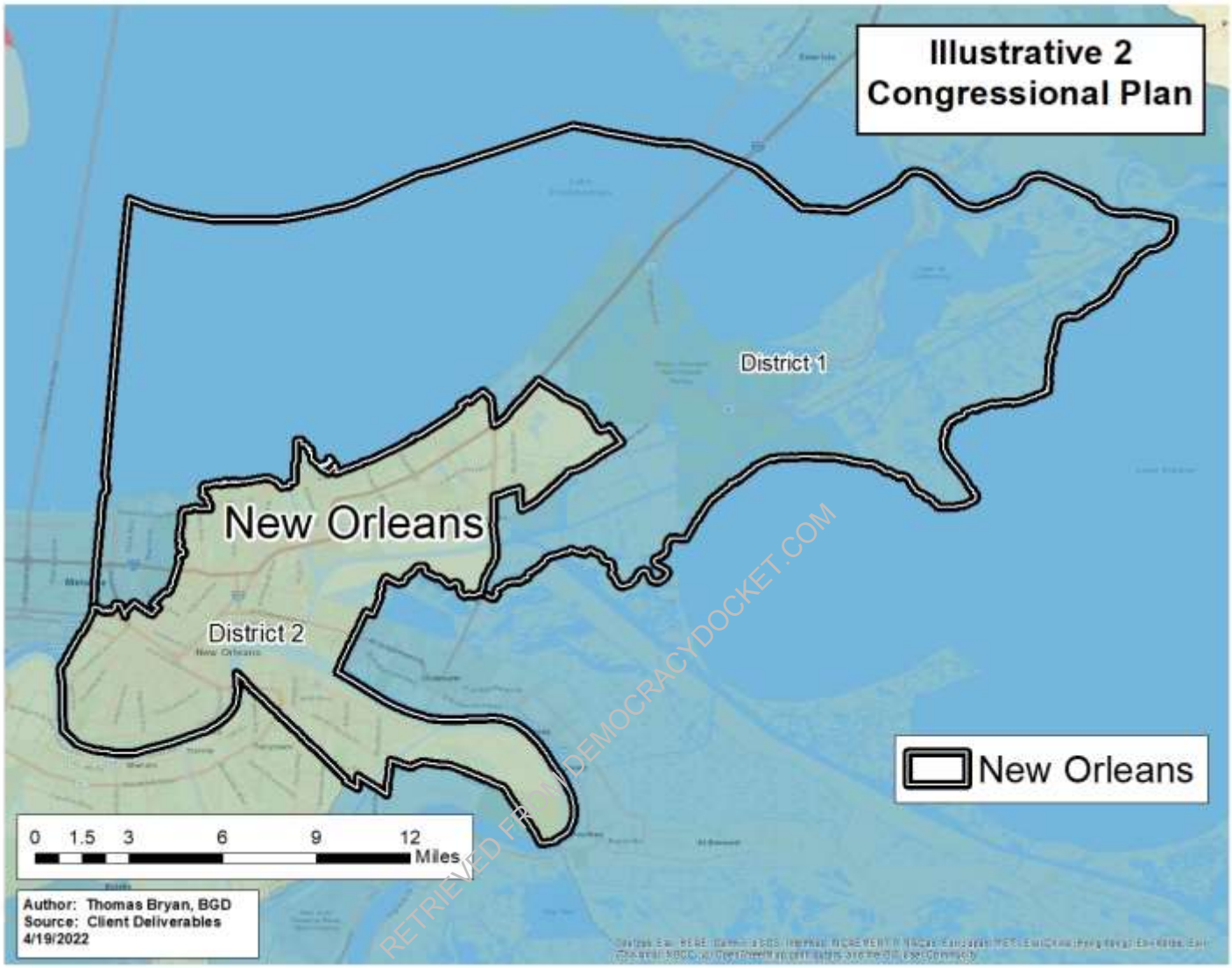
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

M. New Orleans Galmon Illustrative 1 Plan Split



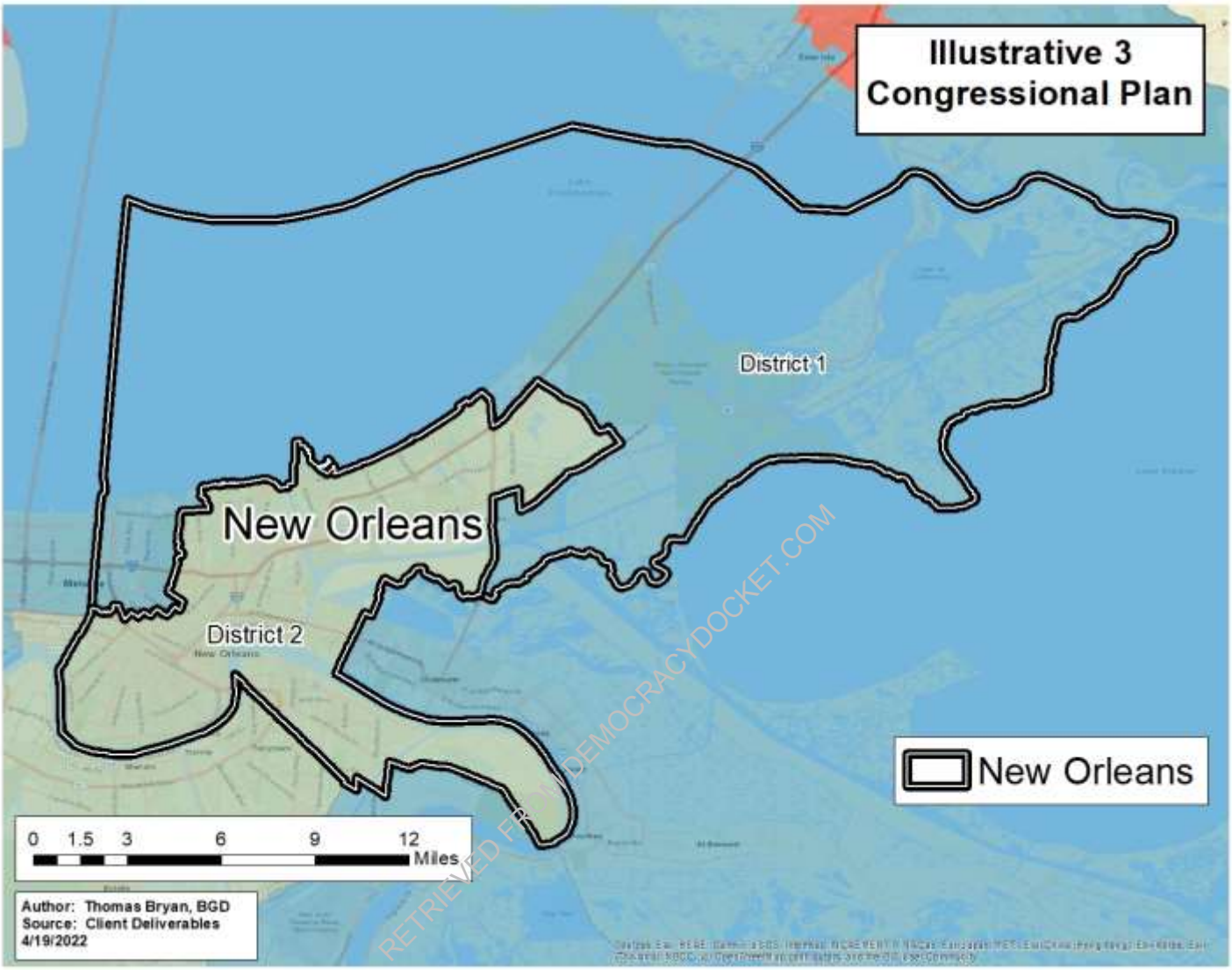
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

N. New Orleans Galmon Illustrative 2 Plan Split



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

O. New Orleans Galmon Illustrative 3 Plan Split

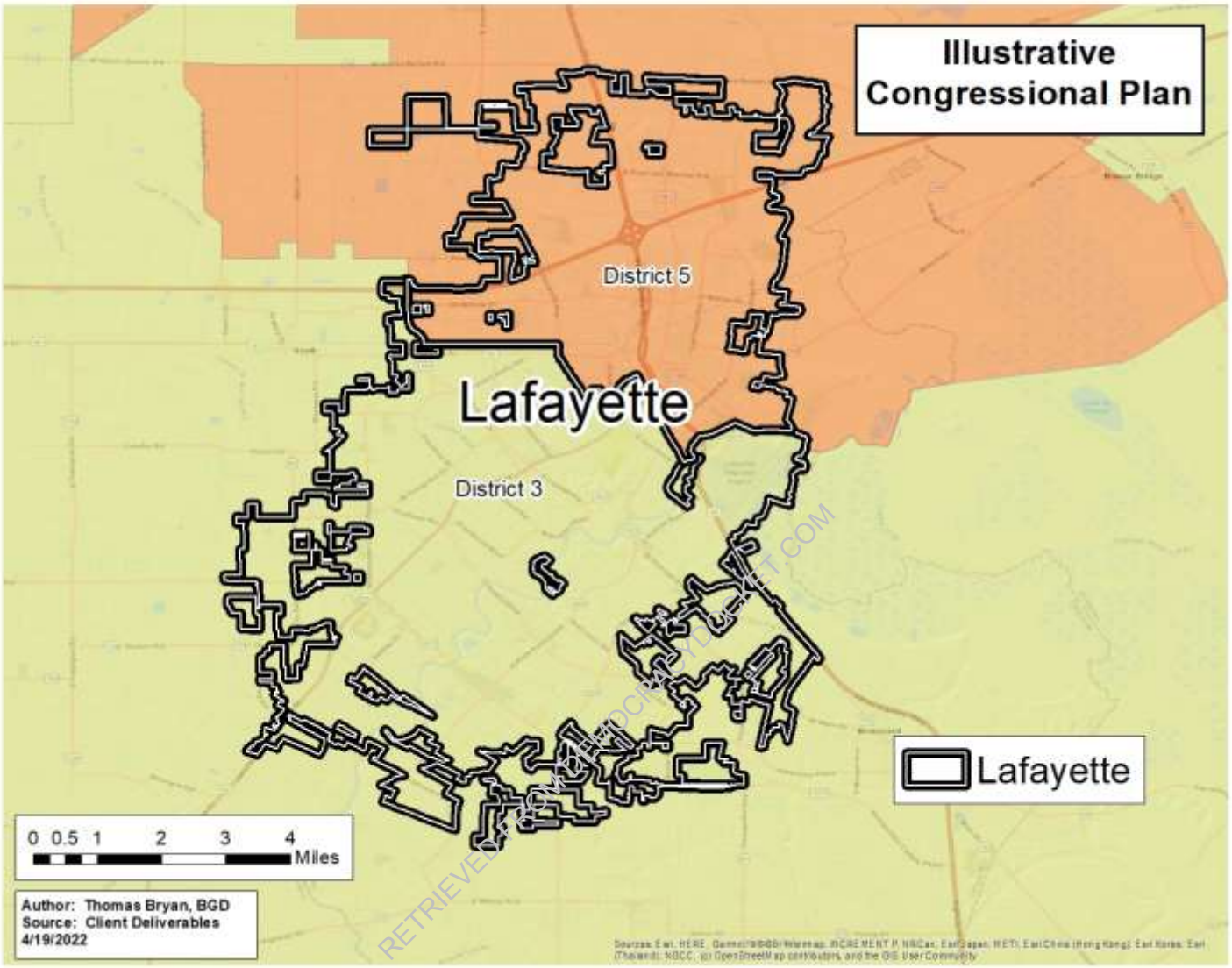


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Lafayette

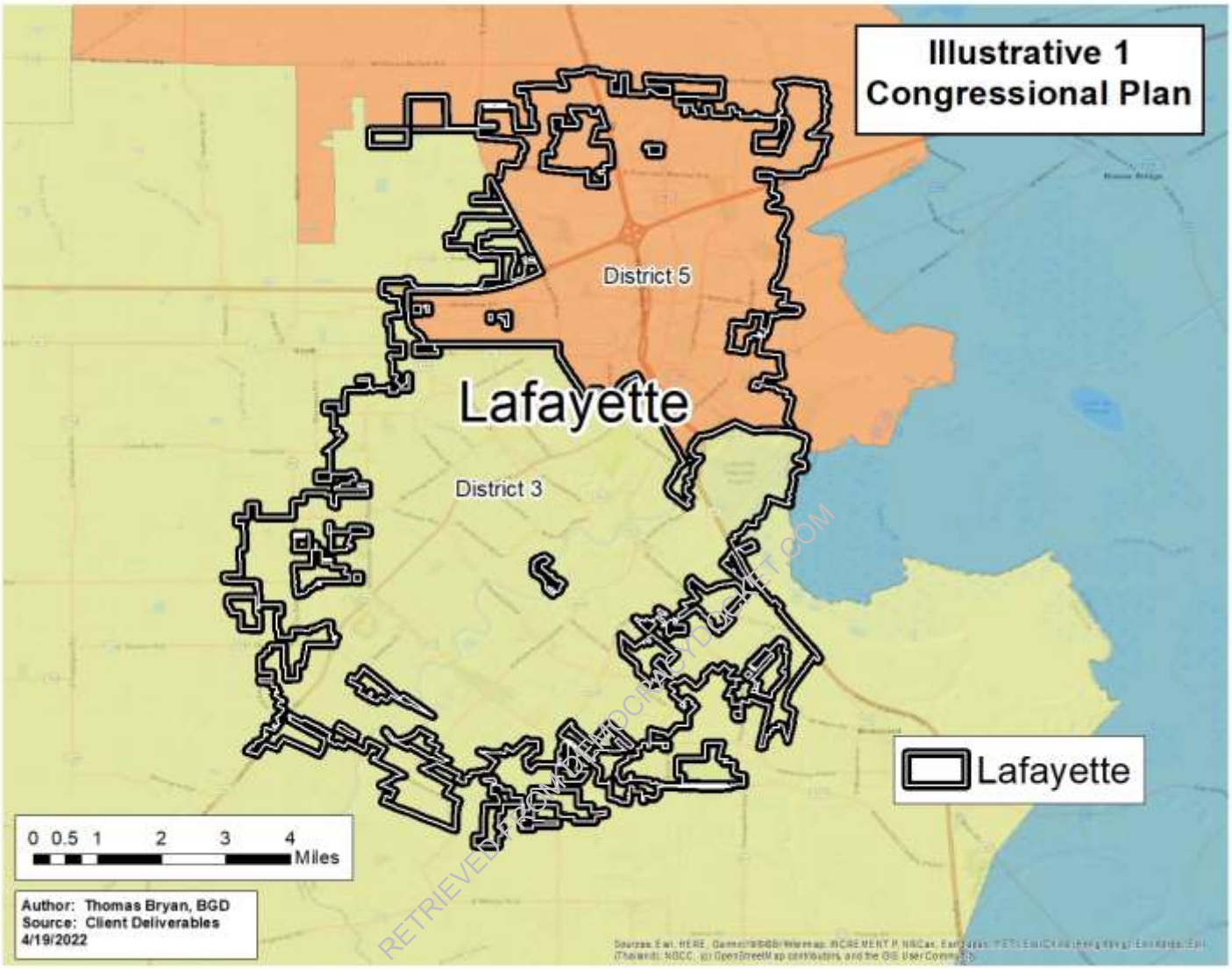
City Splits by Plan

P. Lafayette Robinson Illustrative Plan Split (the Enrolled Plan does not split Lafayette)



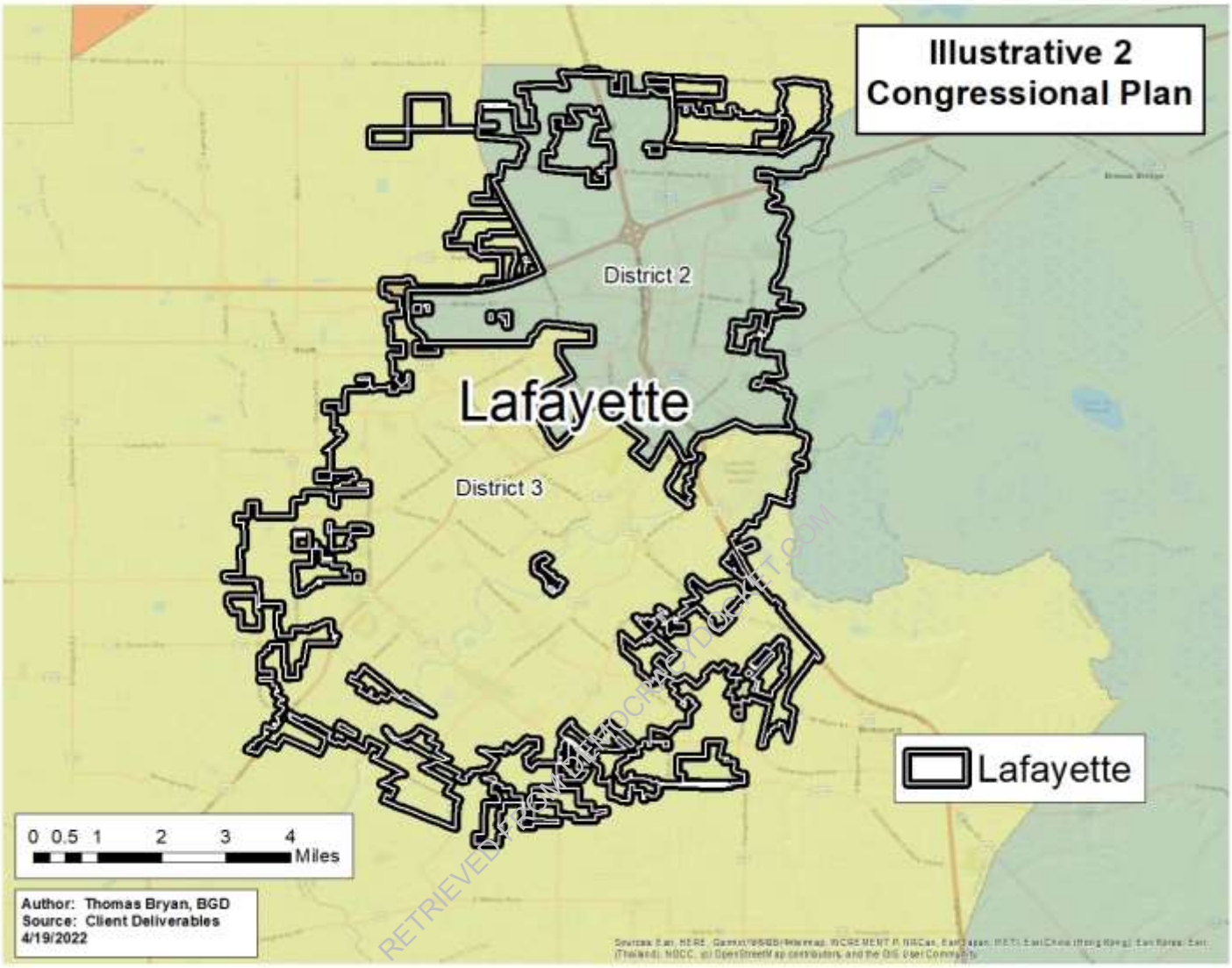
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Q. Lafayette Galmon Illustrative 1 Plan Split



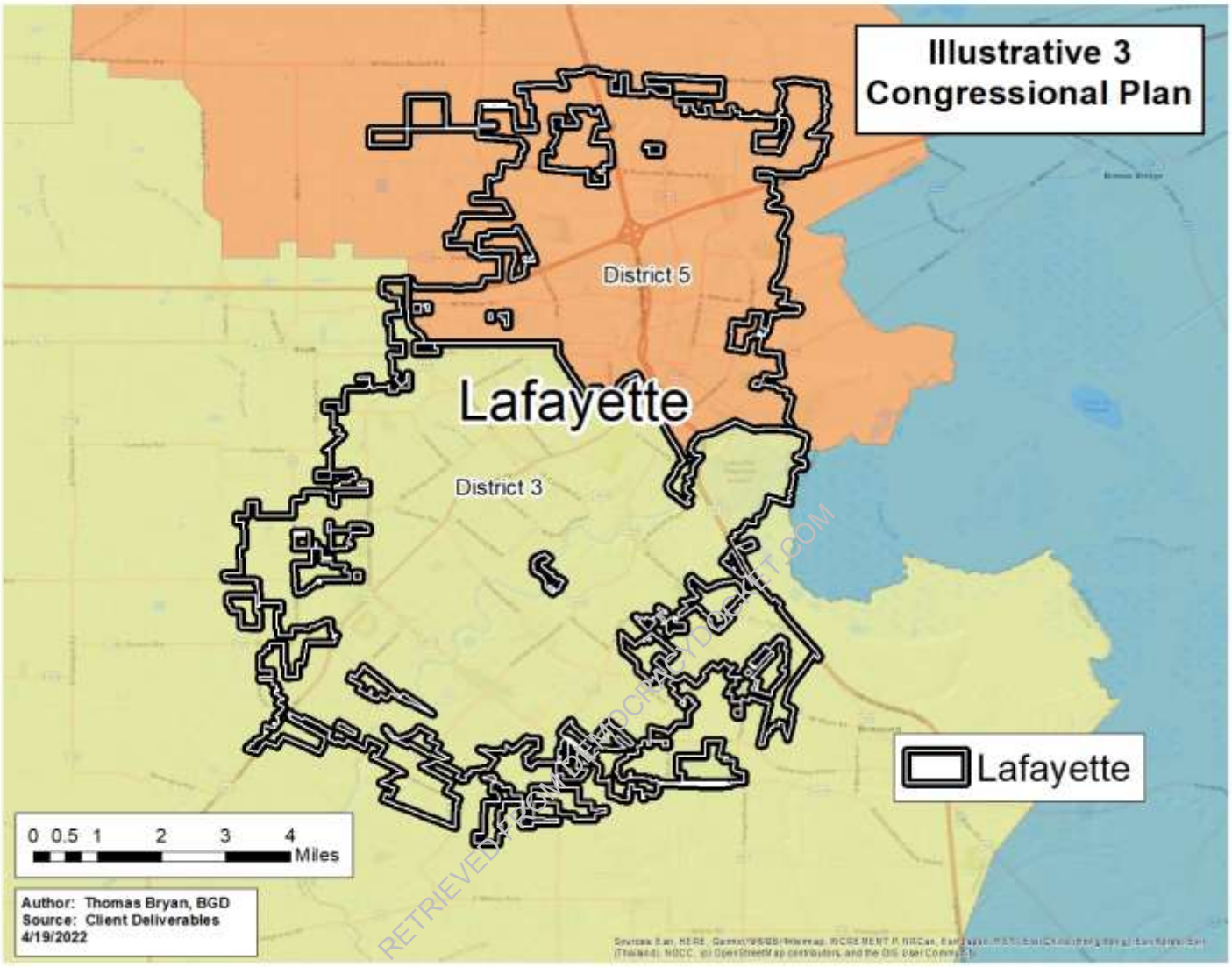
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

R. Lafayette Galmon Illustrative 2 Plan Split



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

S. Lafayette Galmon Illustrative 3 Plan Split

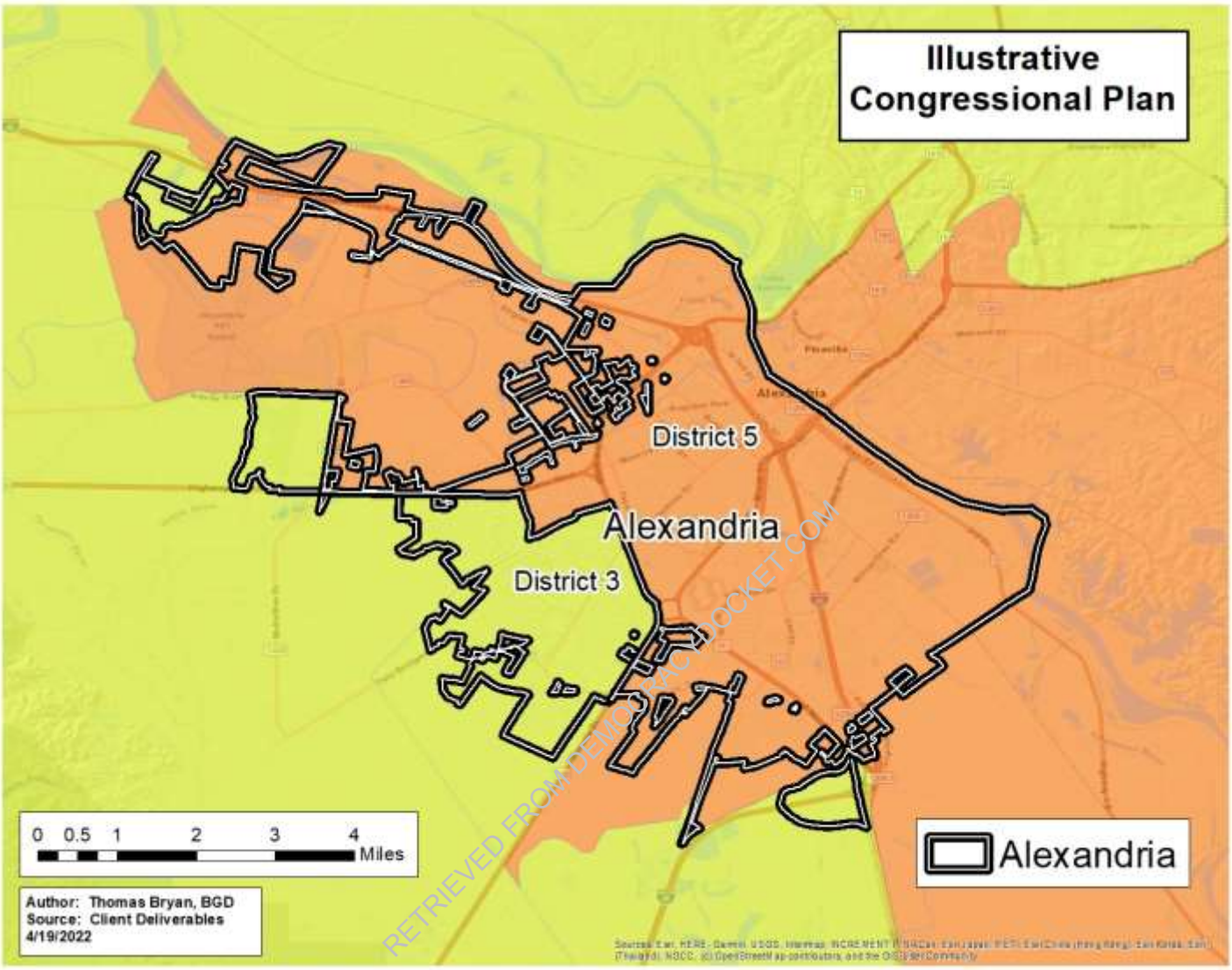


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Alexandria

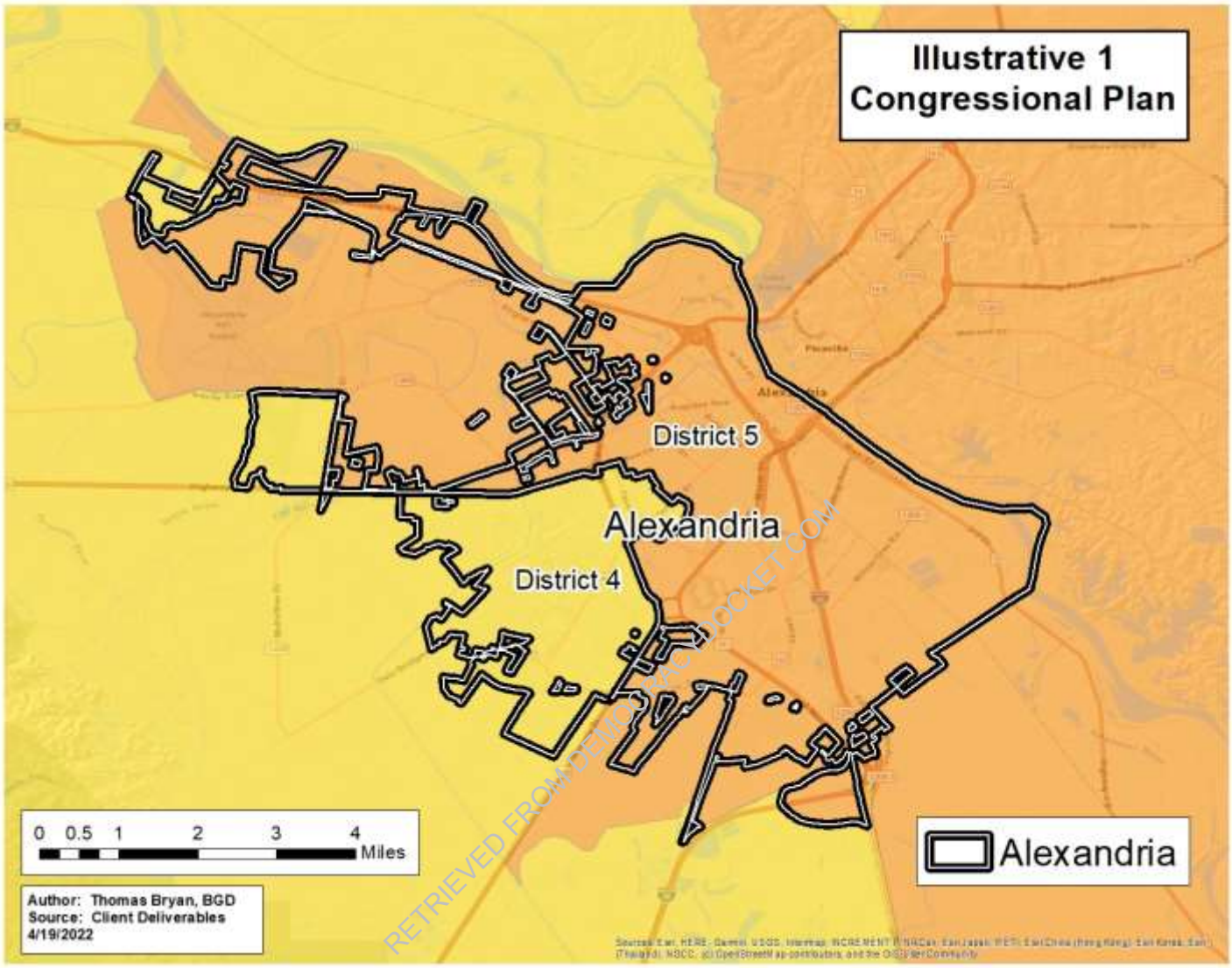
City Splits by Plan

T. Alexandria Robinson Illustrative Plan Split (the Enrolled Plan does not Split Alexandria)



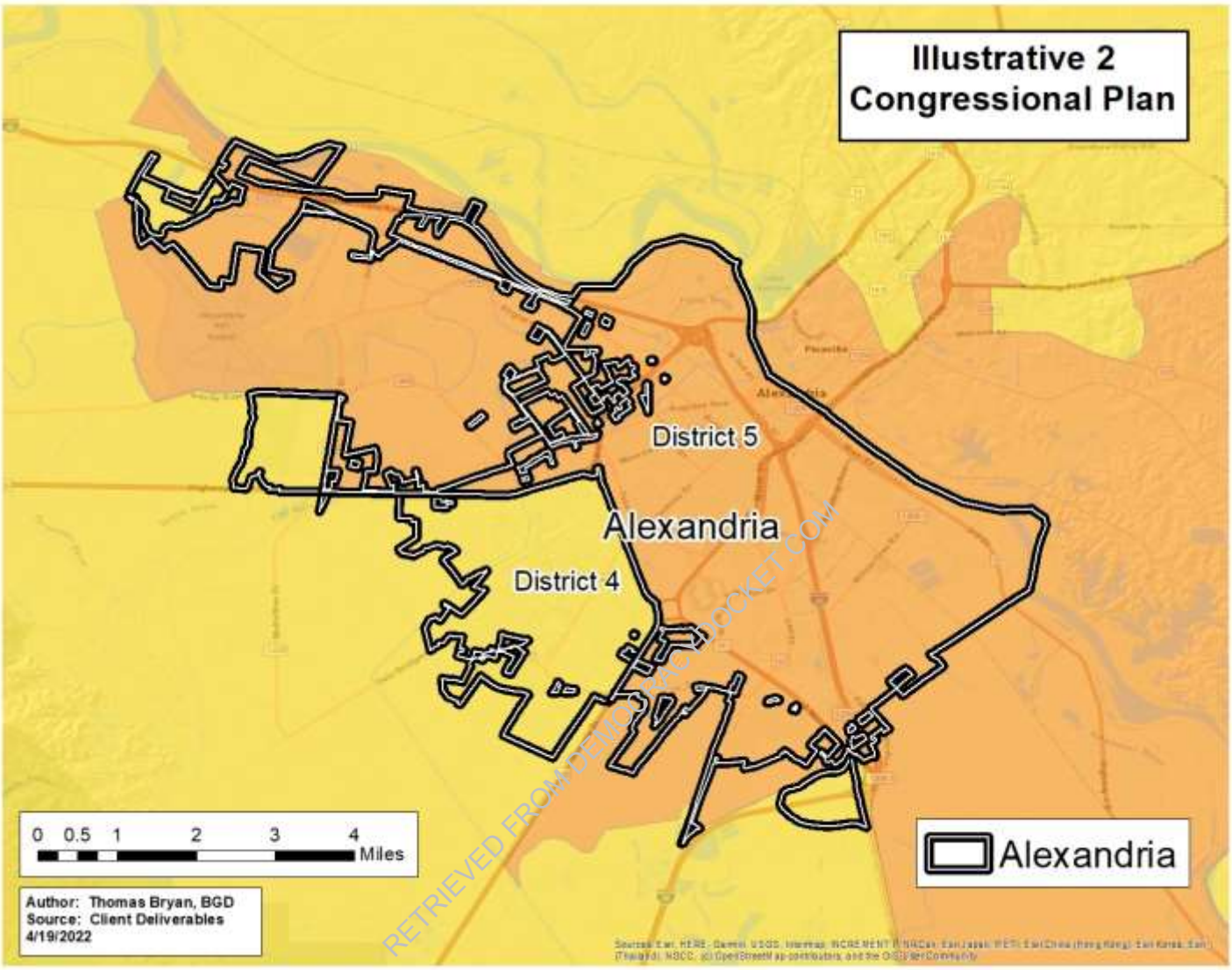
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

U. Alexandria Galmon Illustrative 1 Plan Split



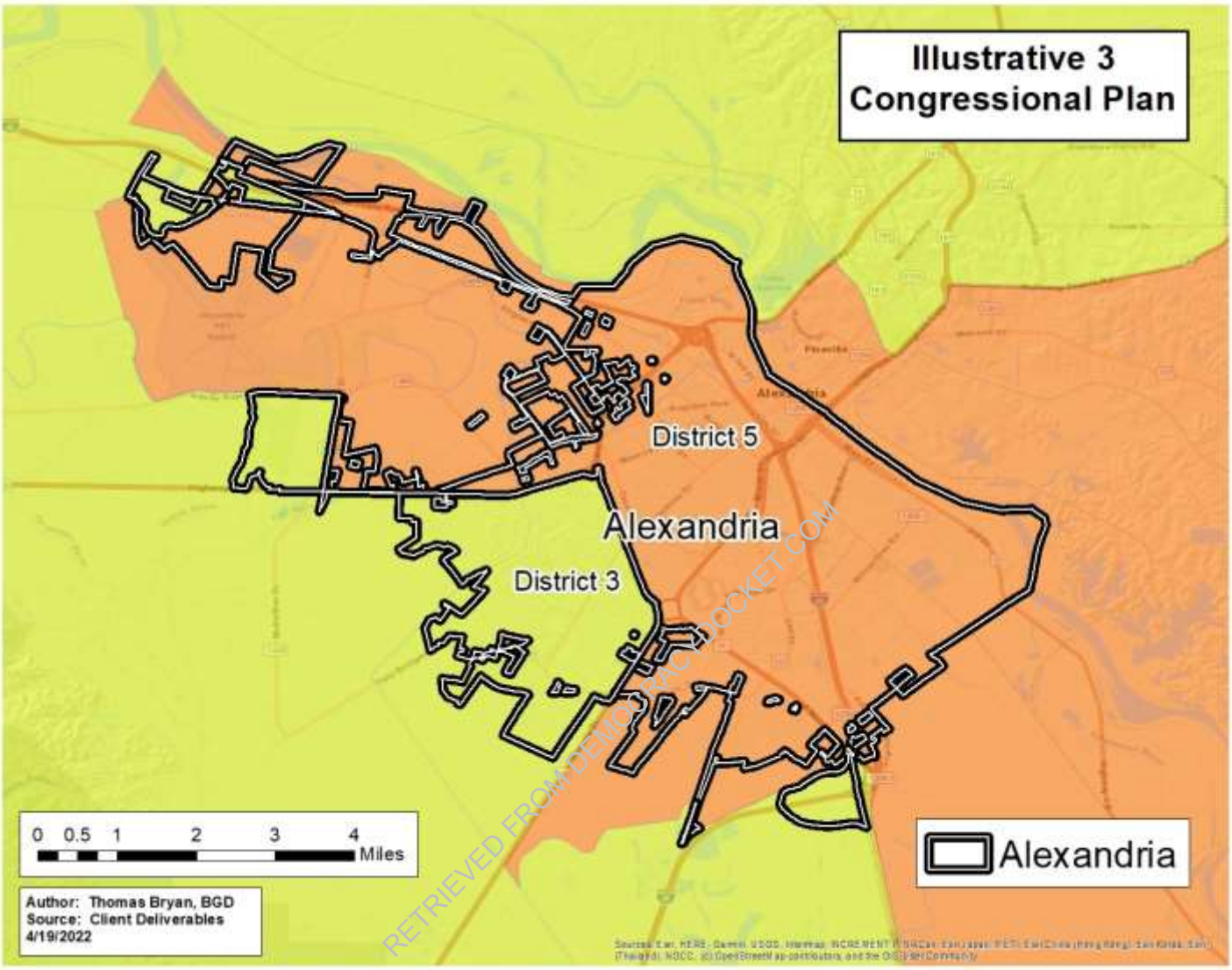
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

V. Alexandria Galmon Illustrative 2 Plan Split



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

W. Alexandria Galmon Illustrative 3 Plan Split

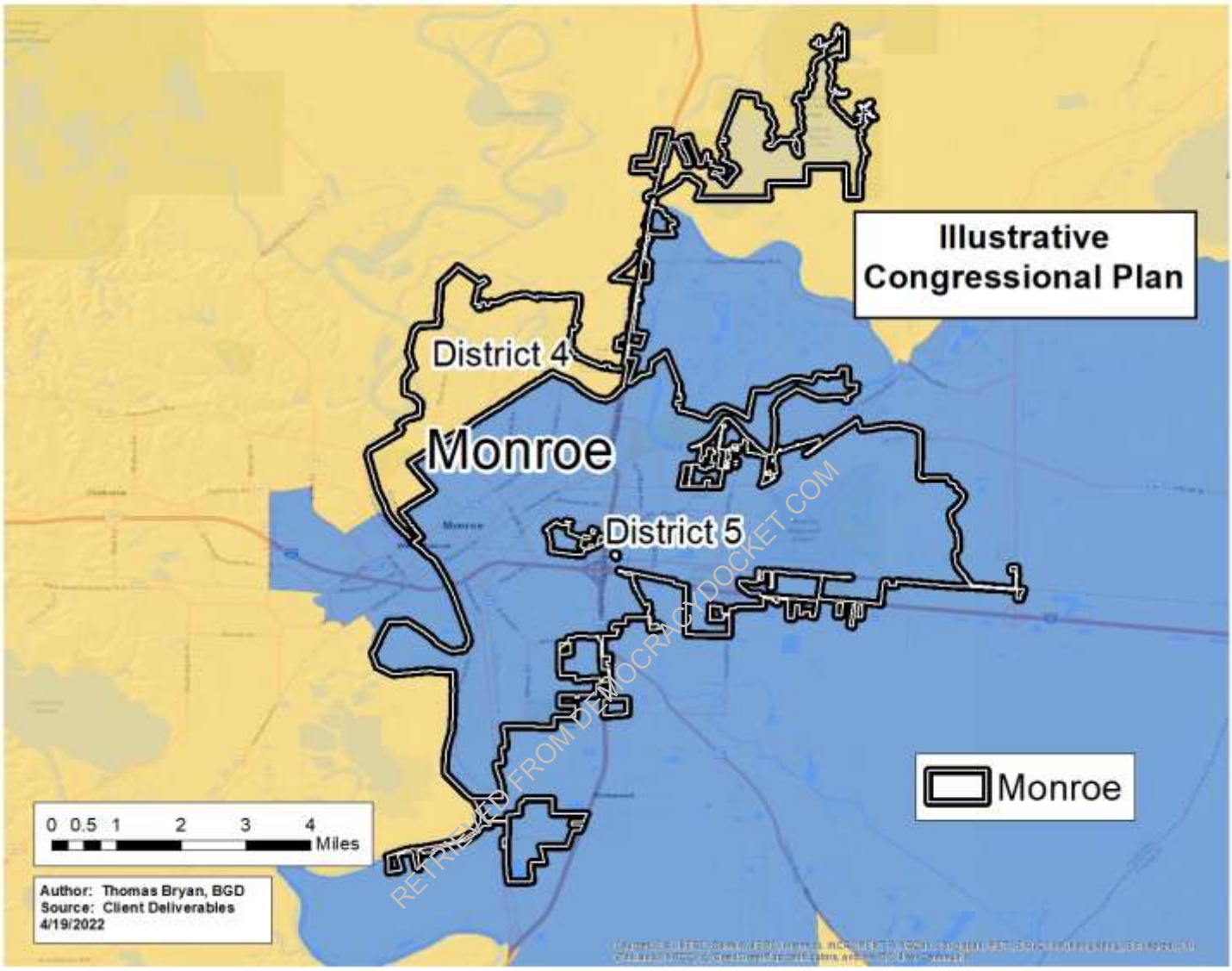


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Monroe

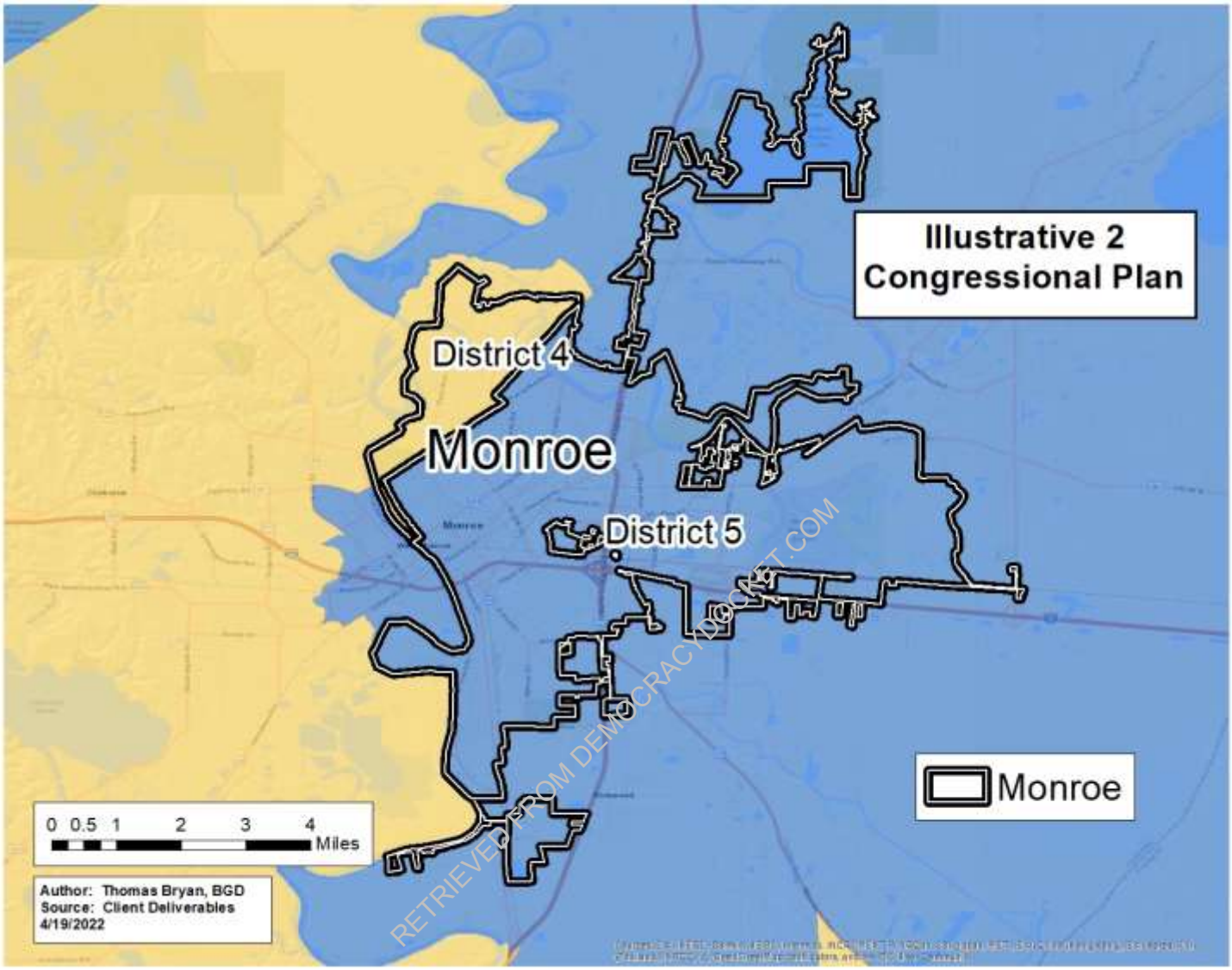
City Splits by Plan

X. Monroe Robinson Illustrative Plan Split (the Enrolled Plan and Galmon Illustrative 1 Plan do not split Monroe)



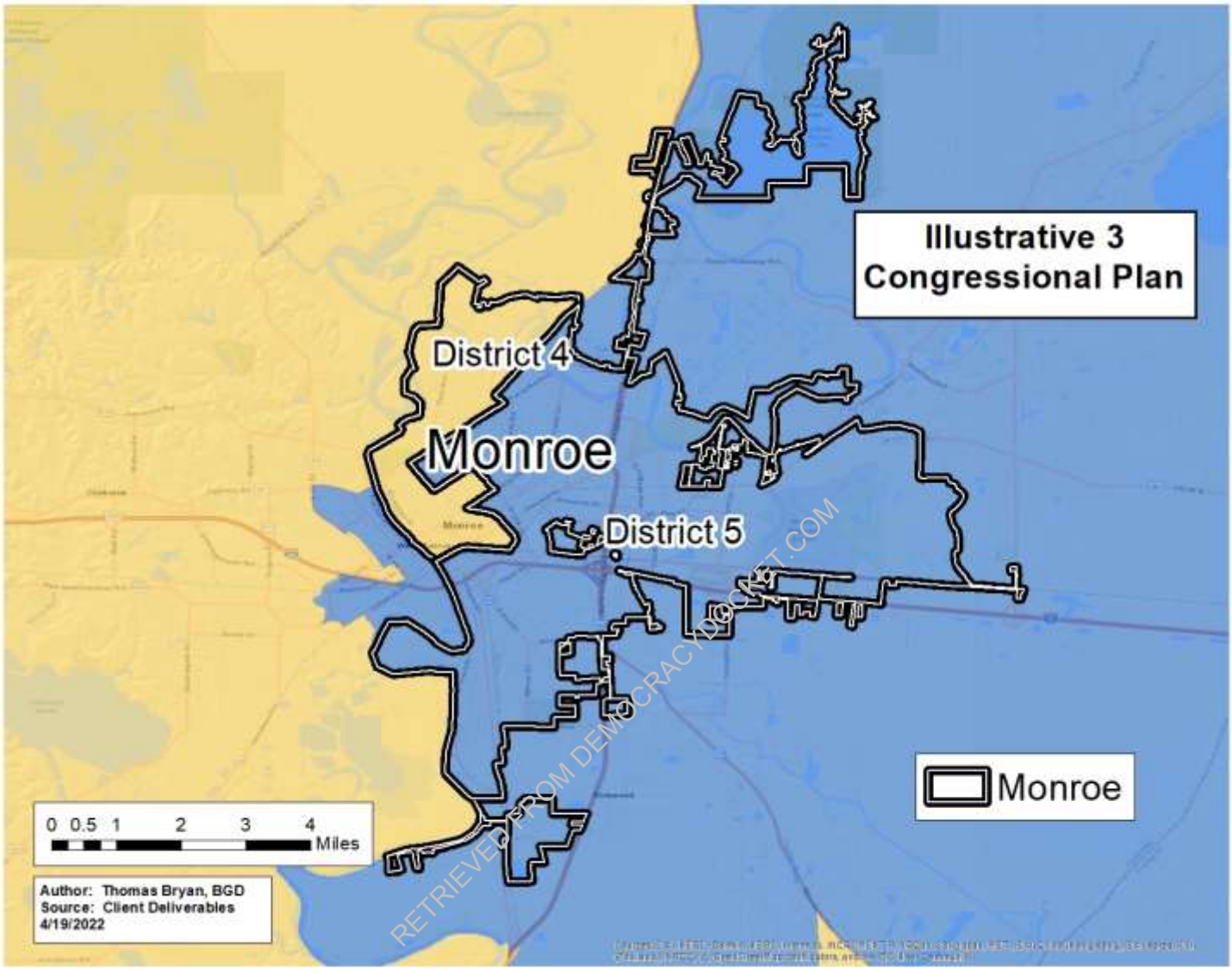
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Y. Monroe Galmon Illustrative 2 Plan Split



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

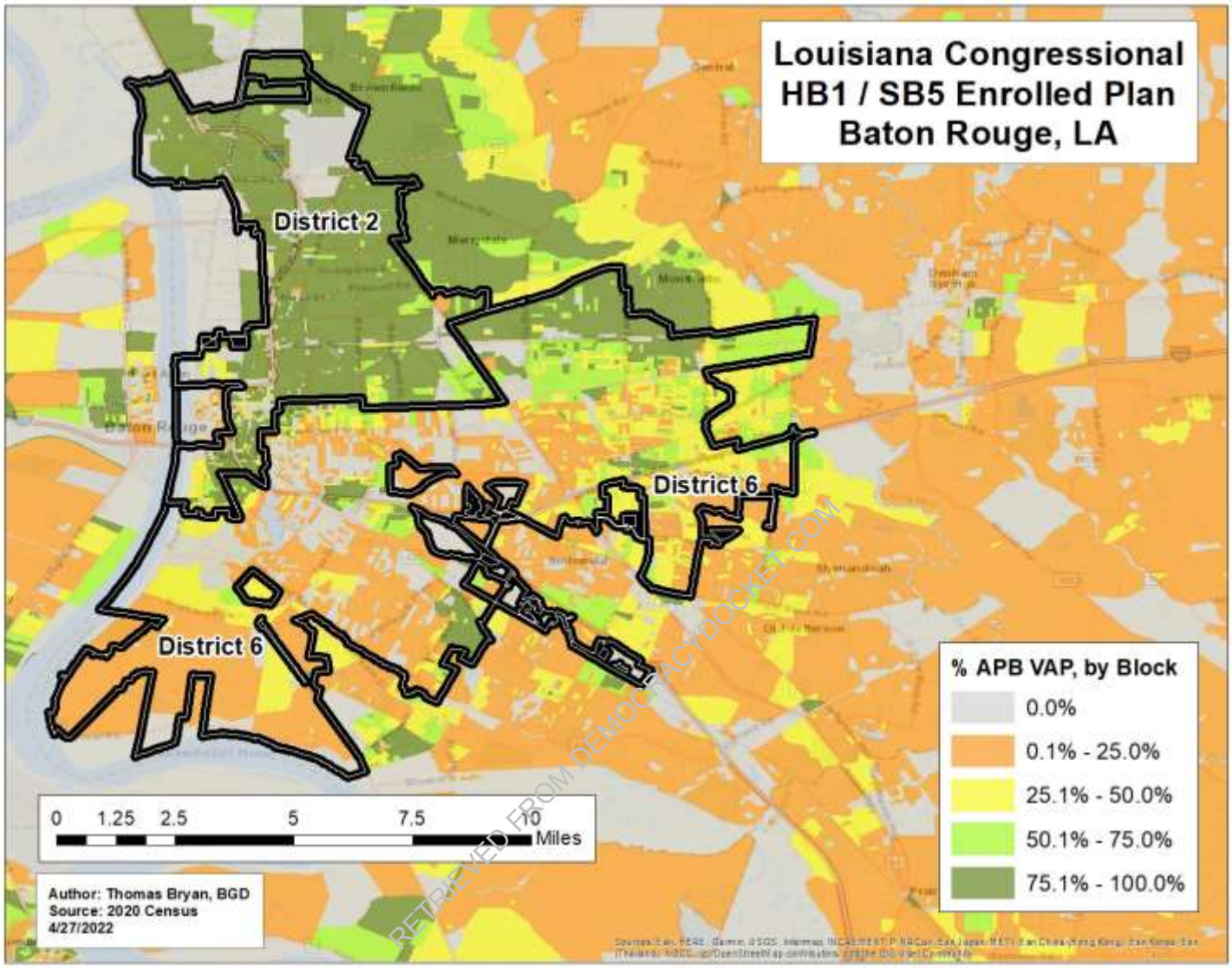
Z. Monroe Galmon Illustrative 3 Plan Split



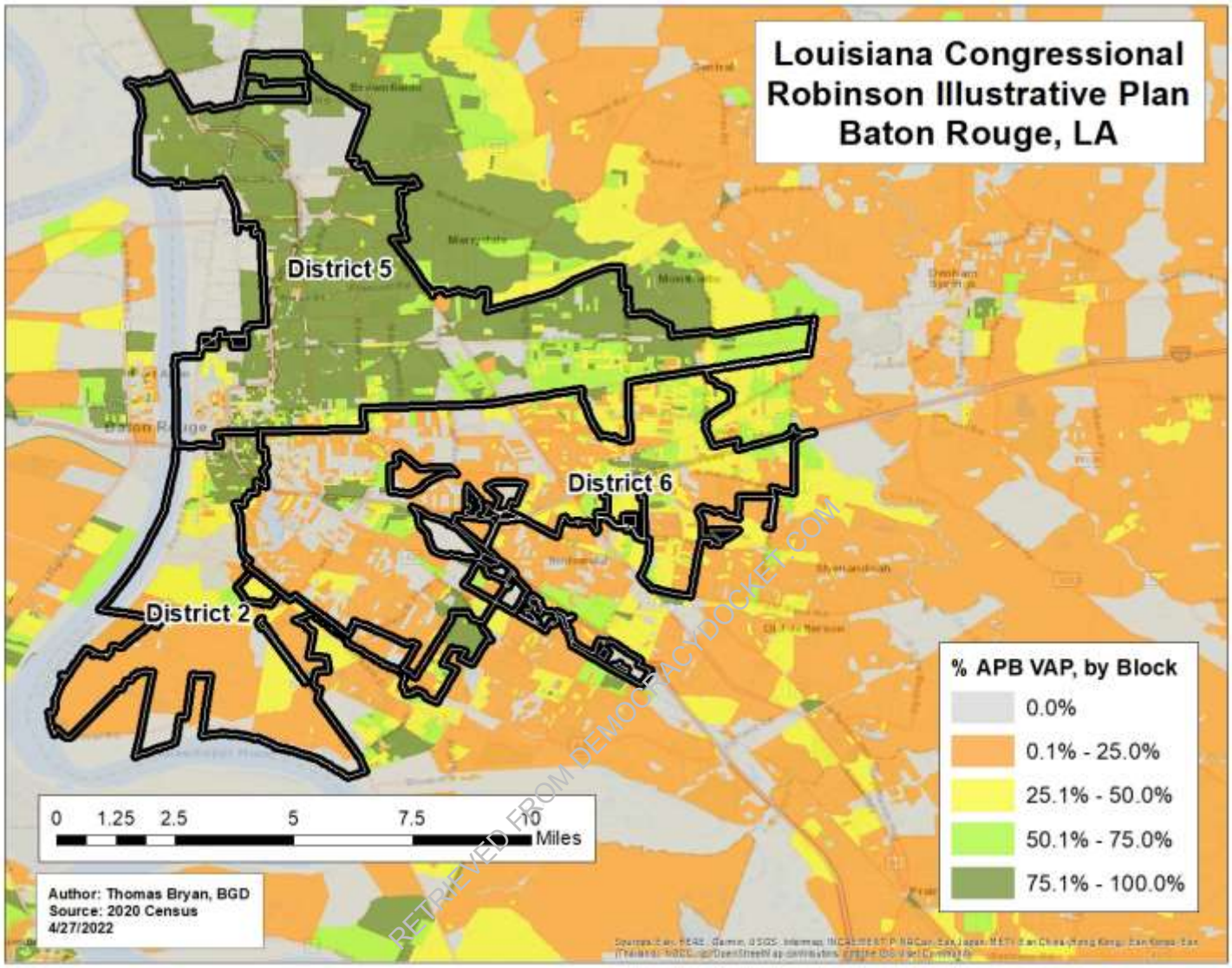
Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Baton Rouge
City Splits by Race
by Plan

AA. Baton Rouge HB1 / SB5 Enrolled Plan Split by % Any Part Black VAP



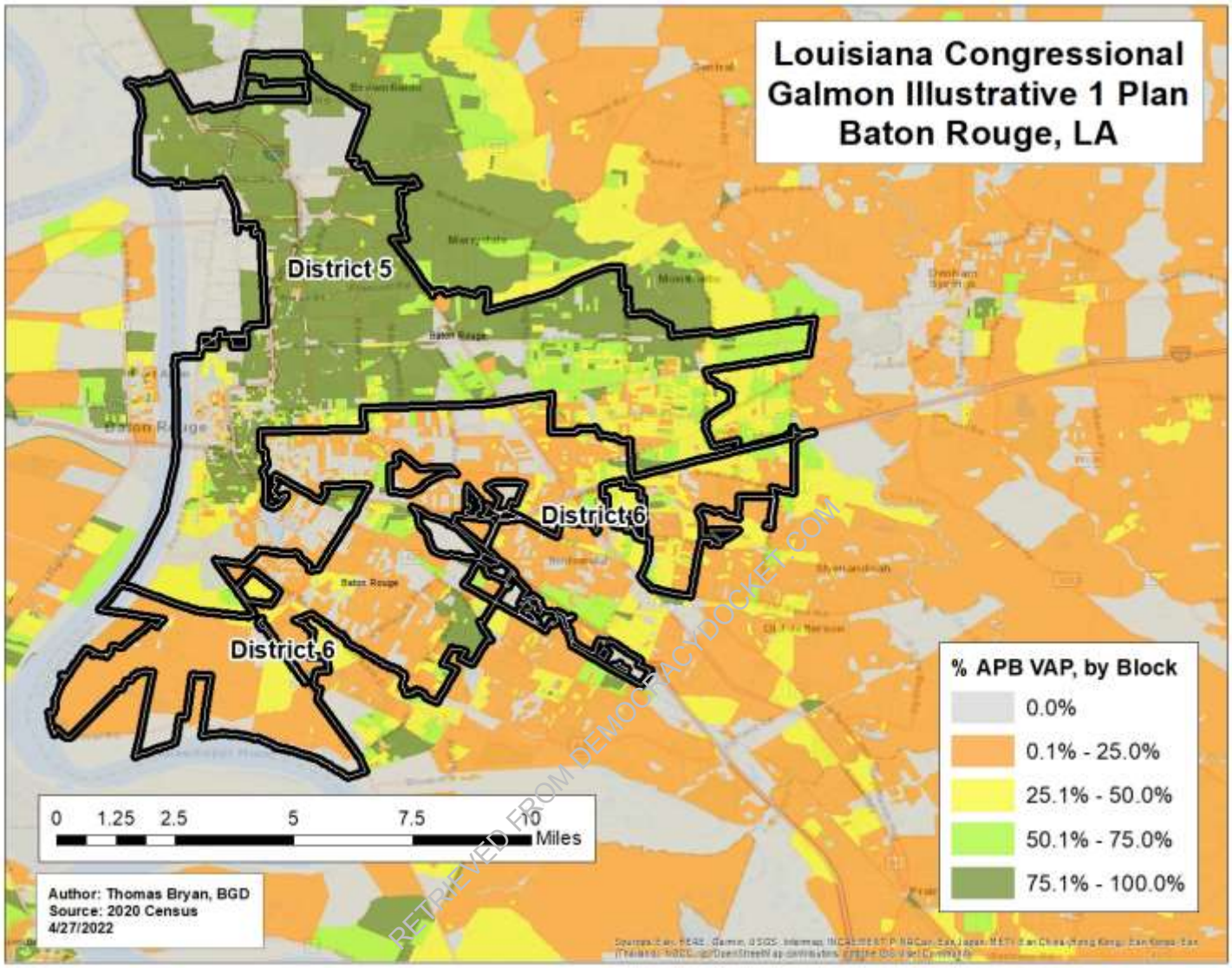
BB. Baton Rouge Robinson Illustrative Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

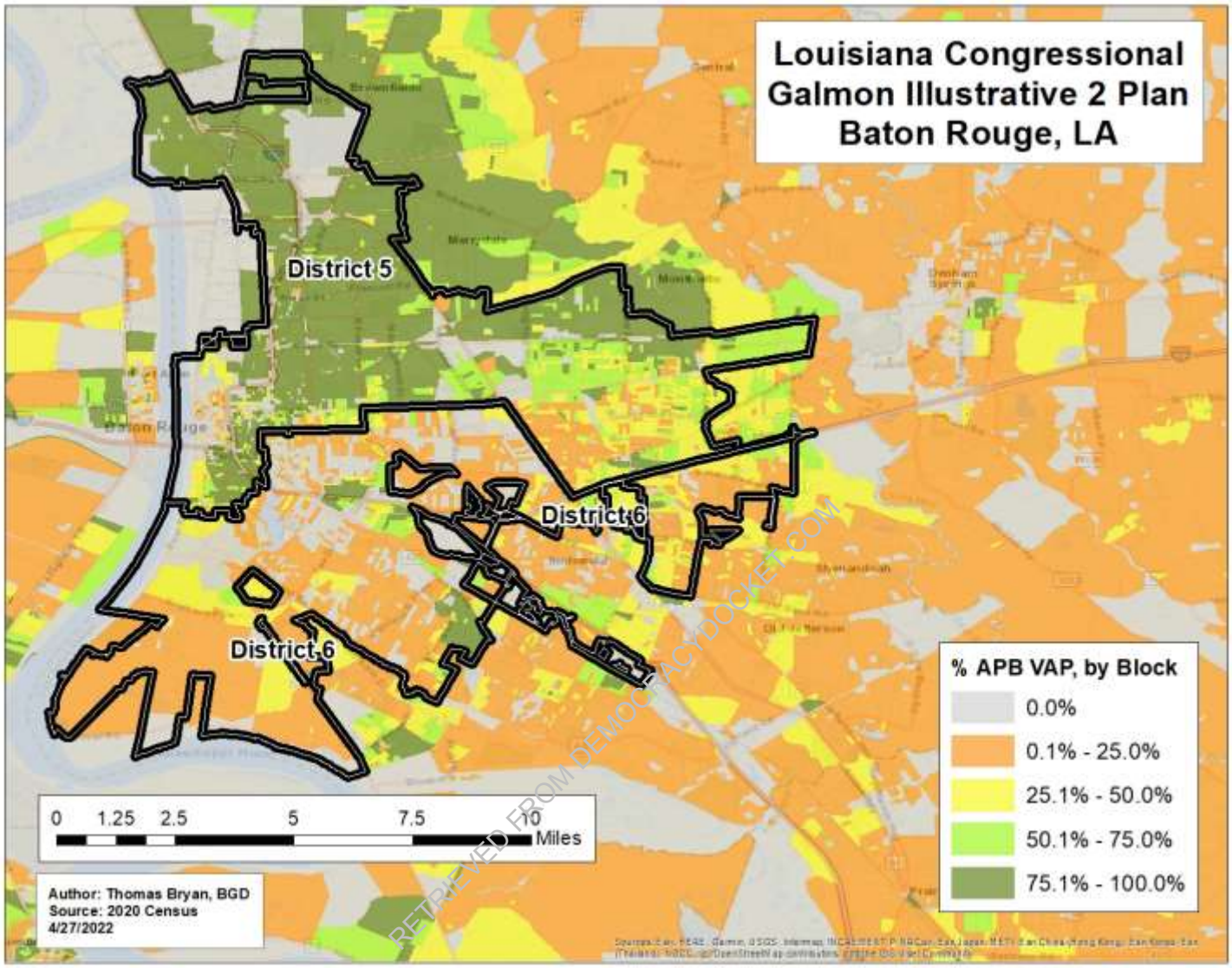
CC. Baton Rouge Galmon Illustrative 1 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

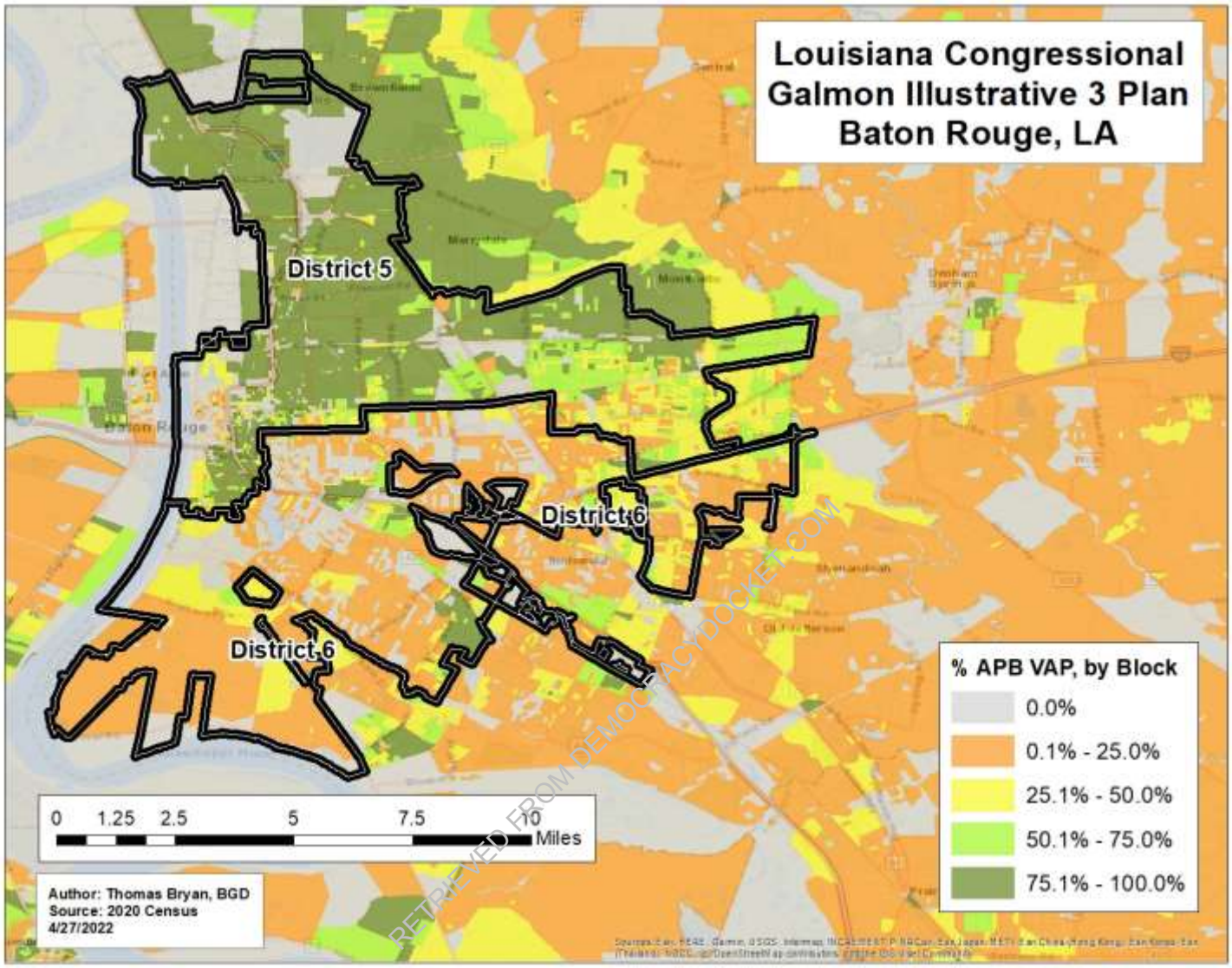
DD. Baton Rouge Galmon Illustrative 2 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

EE. Baton Rouge Galmon Illustrative 3 Plan Split by % Any Part Black VAP

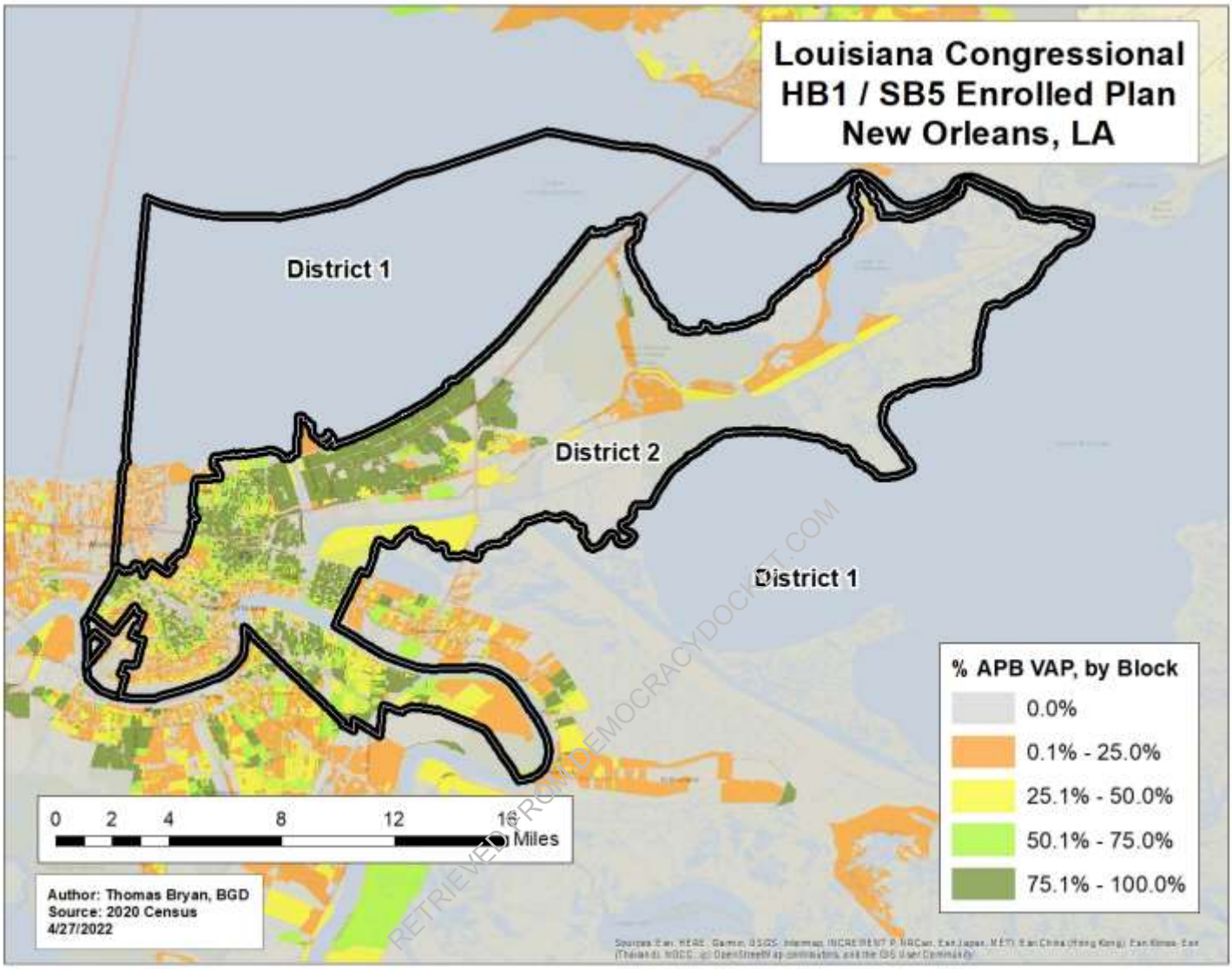


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

New Orleans
City Splits by Race
by Plan

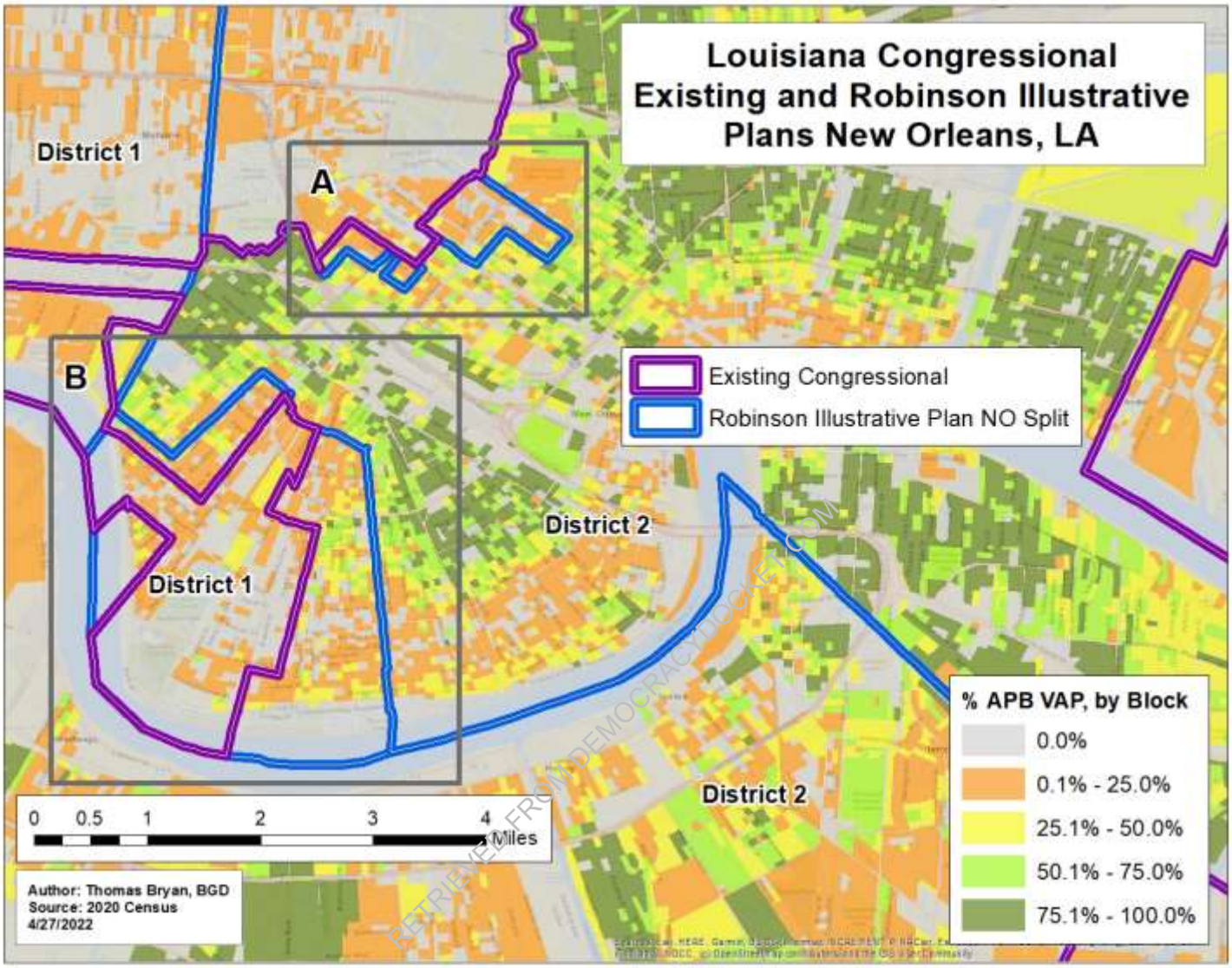
FF. New Orleans HB1 / SB5 Enrolled Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

GG. New Orleans Existing Plan and Robinson Illustrative Plan by % Any Part Black VAP

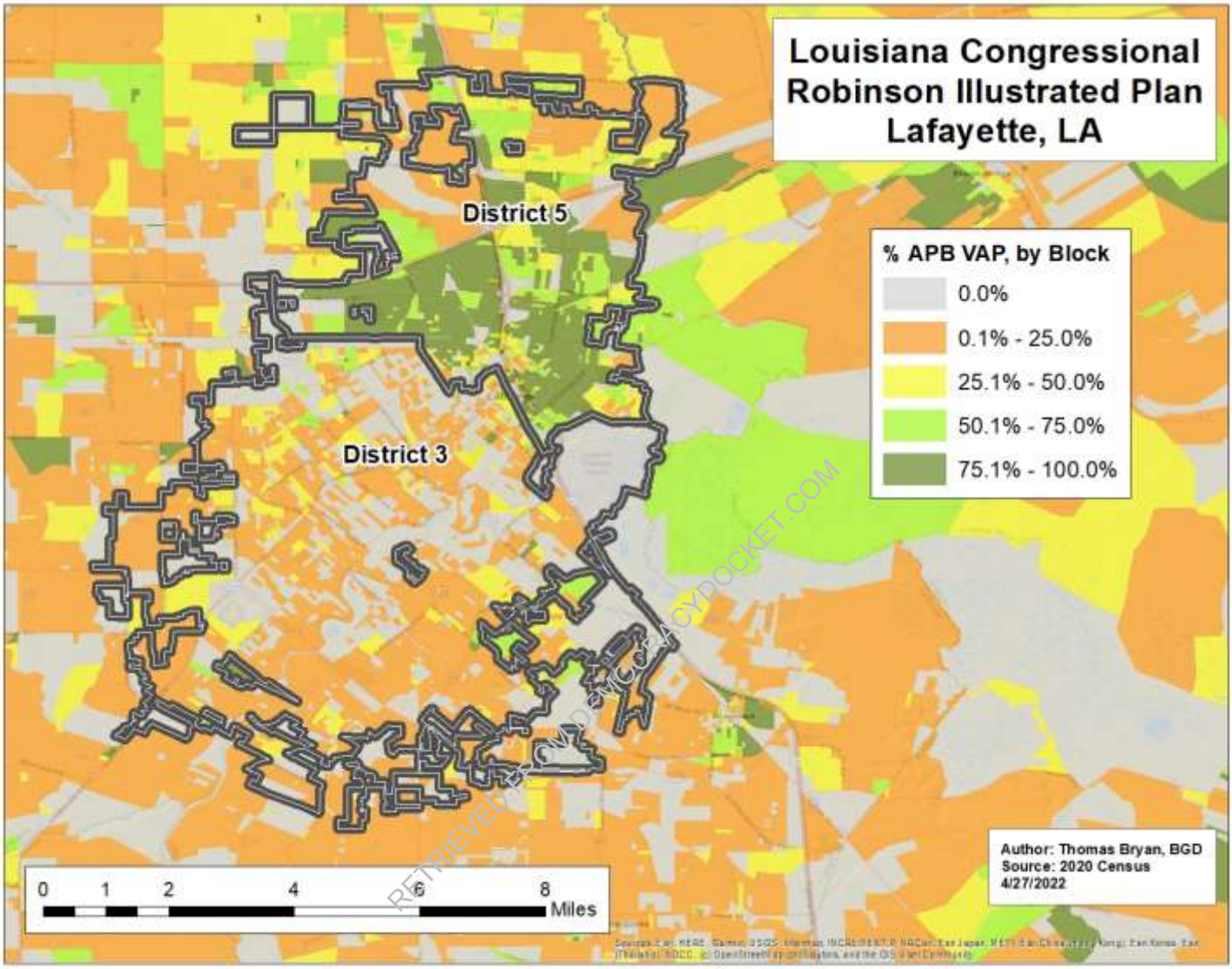


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

Lafayette
City Splits by Race
by Plan

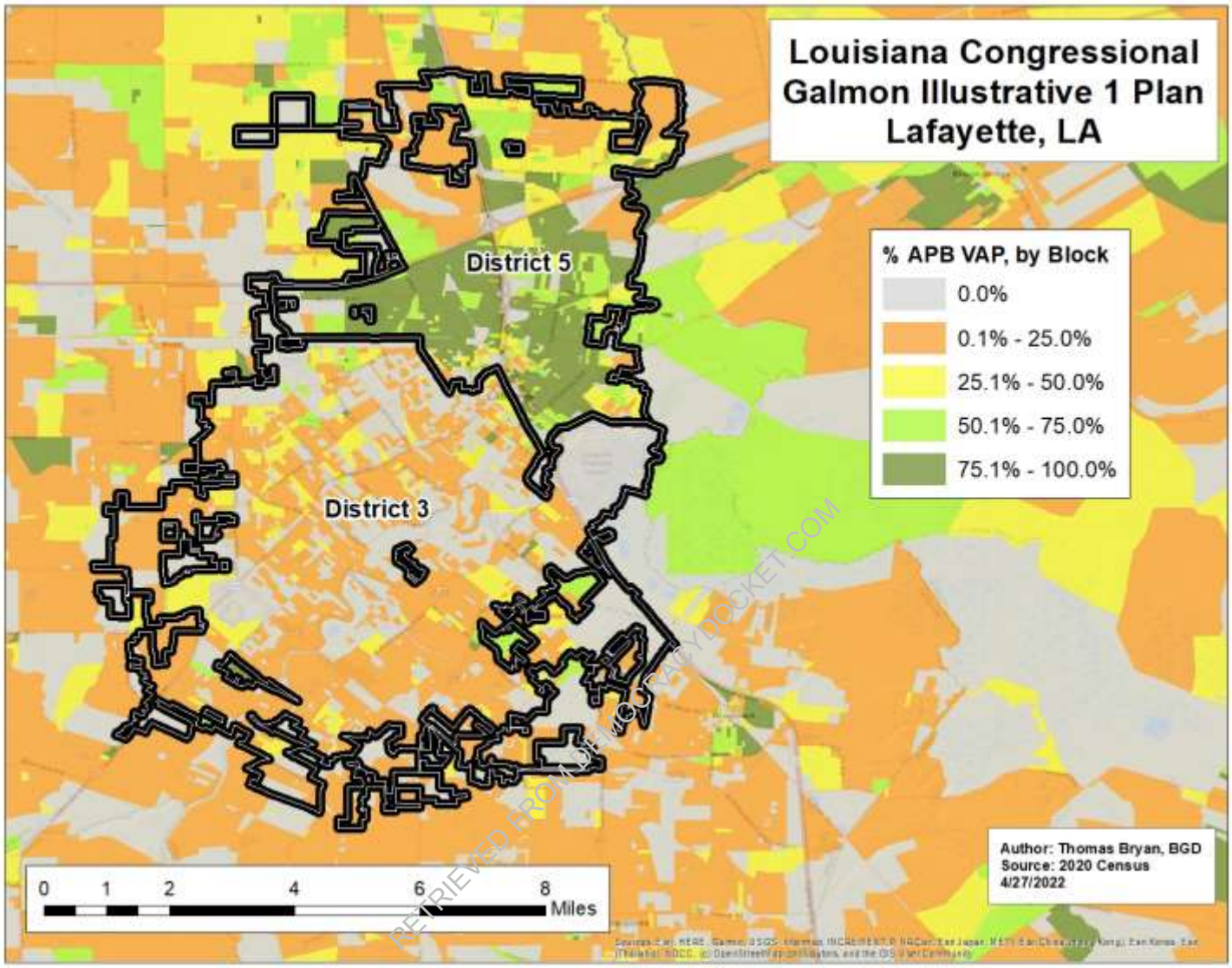
HH. Lafayette Robinson Illustrative Plan Split by % Any Part Black VAP (the Enrolled Plan does not split Lafayette)



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

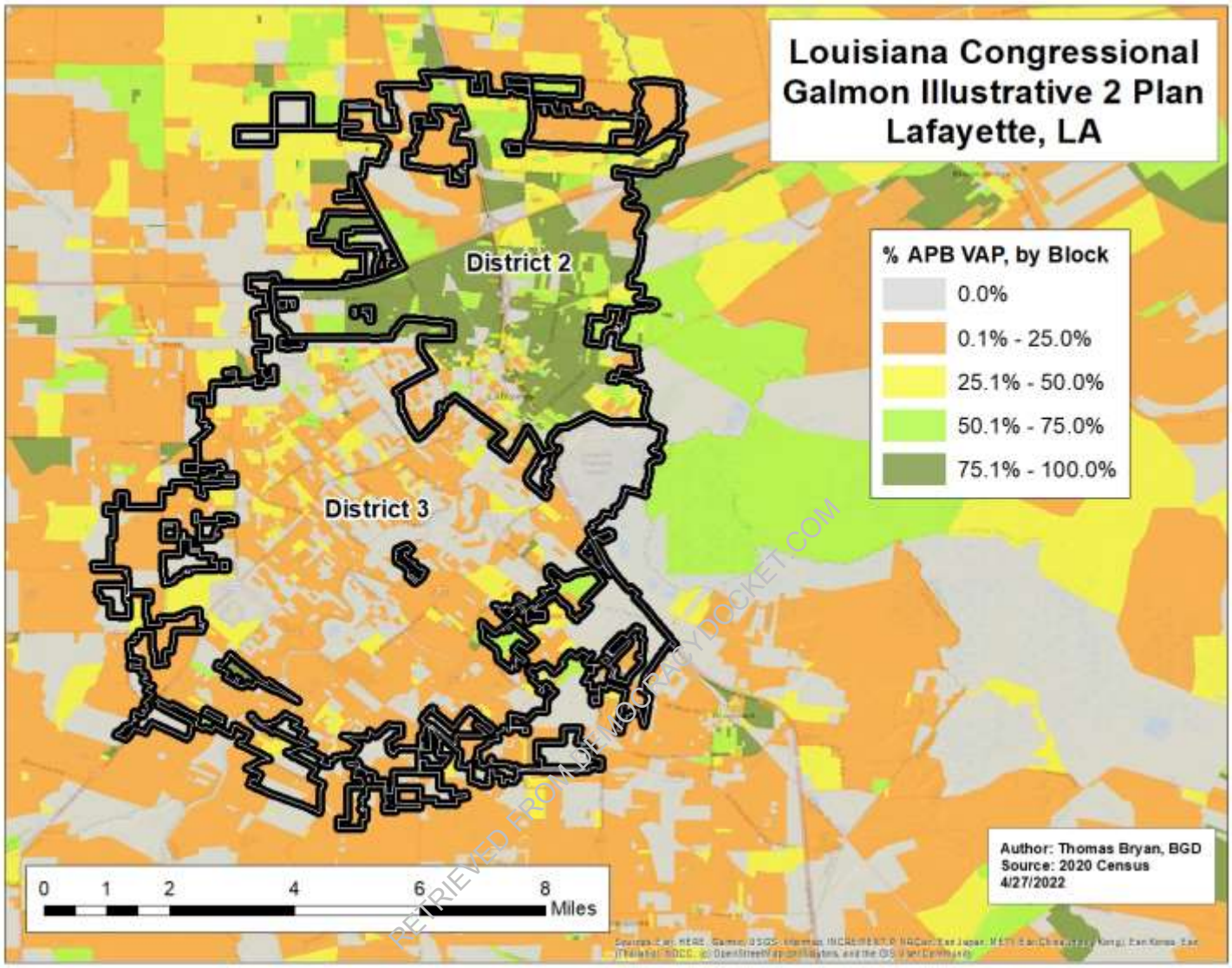
II. Lafayette Galmon Illustrative 1 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

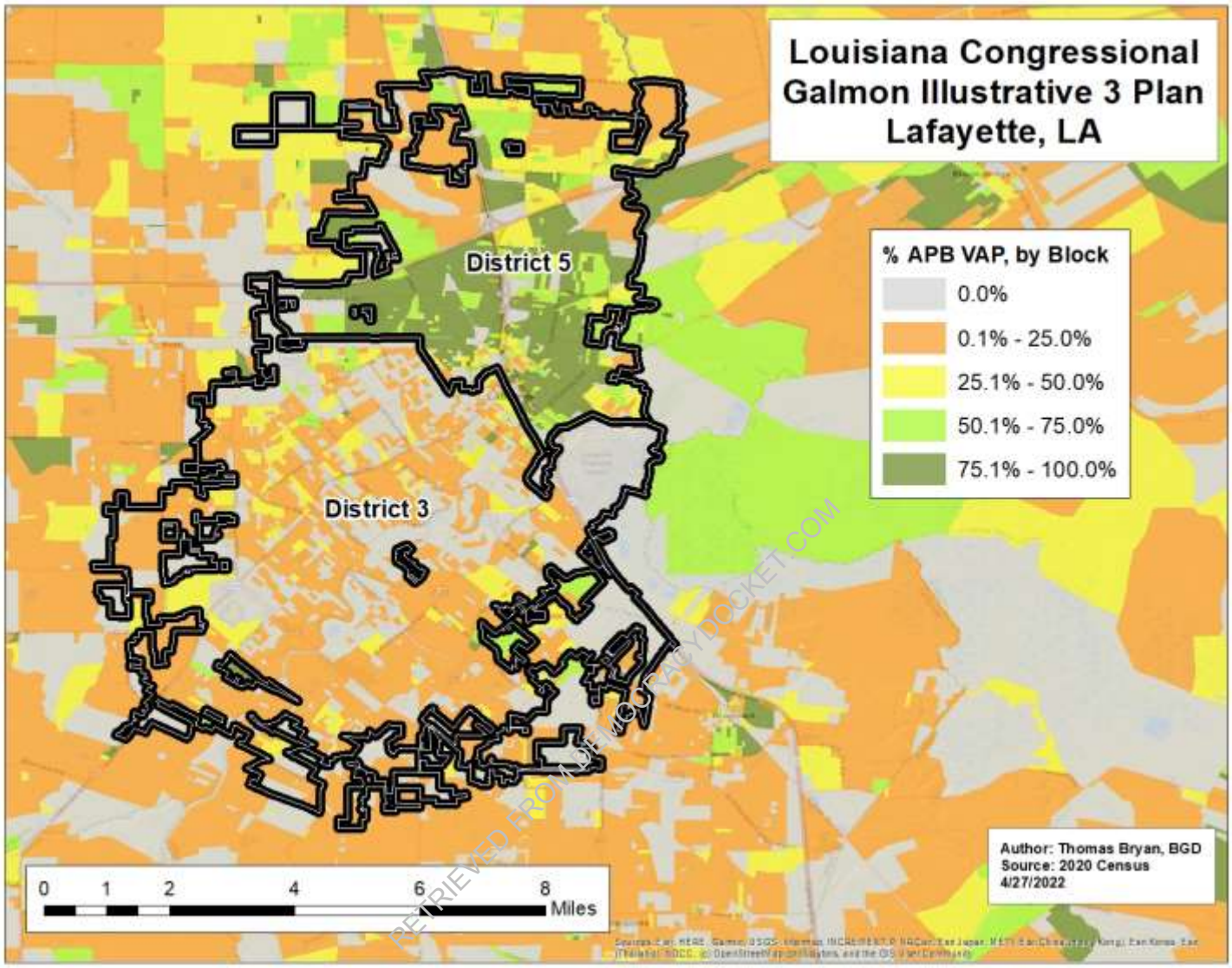
JJ. Lafayette Galmon Illustrative 2 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

KK. Lafayette Galmon Illustrative 3 Plan Split by % Any Part Black VAP

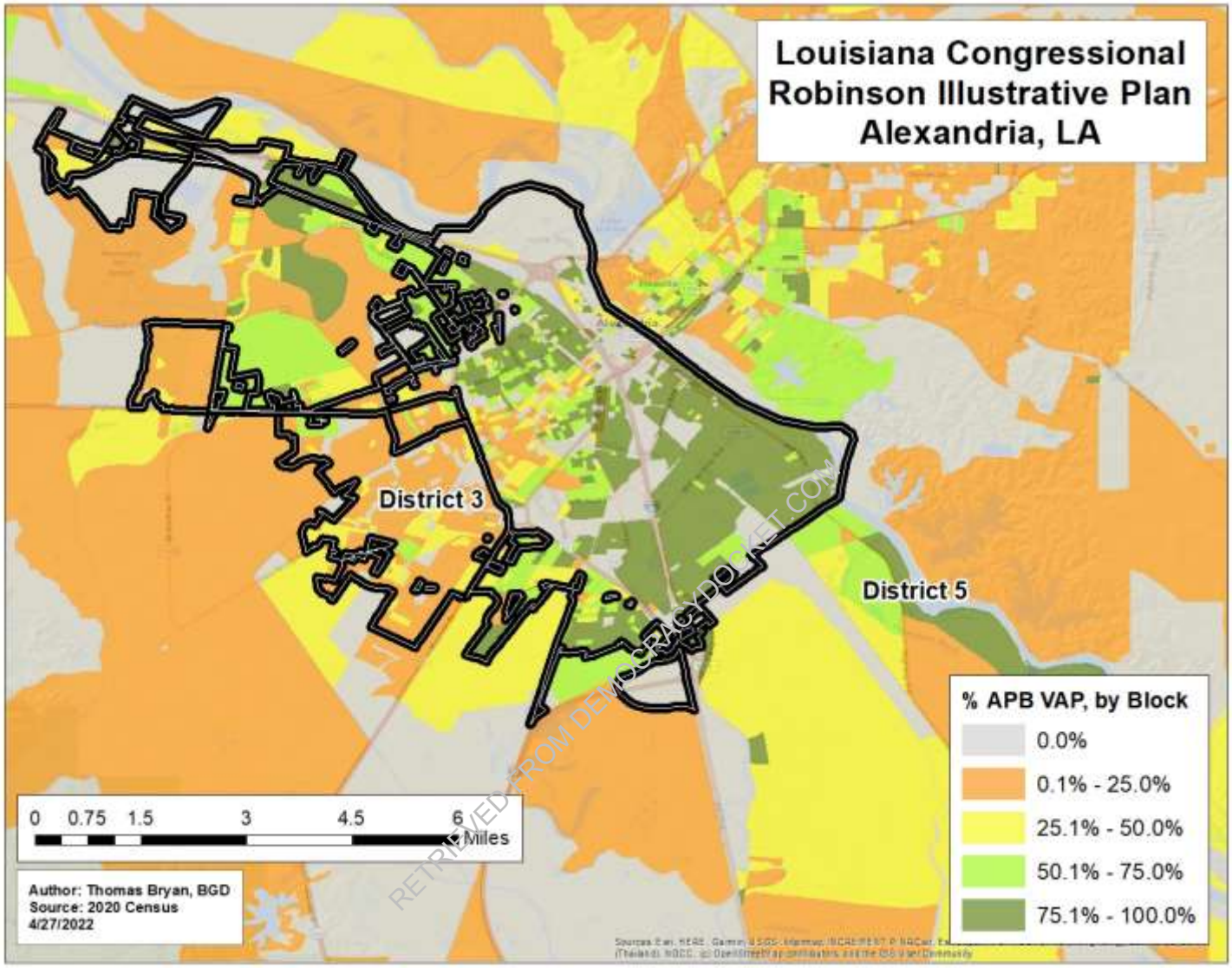


Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

Alexandria
City Splits by Race
by Plan

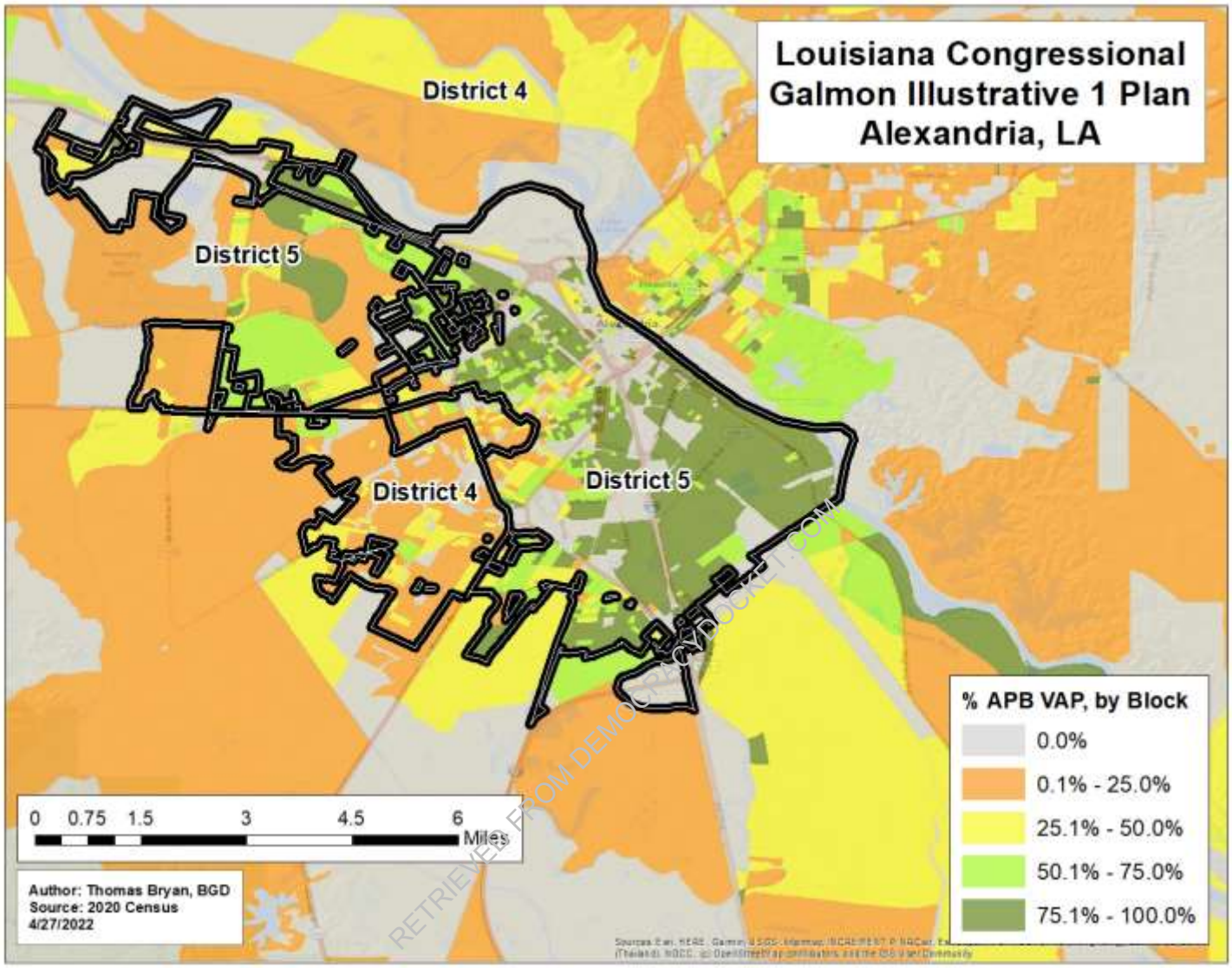
LL. Alexandria Robinson Illustrative Plan Split by % Any Part Black VAP (the Enrolled Plan does not split Alexandria)



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

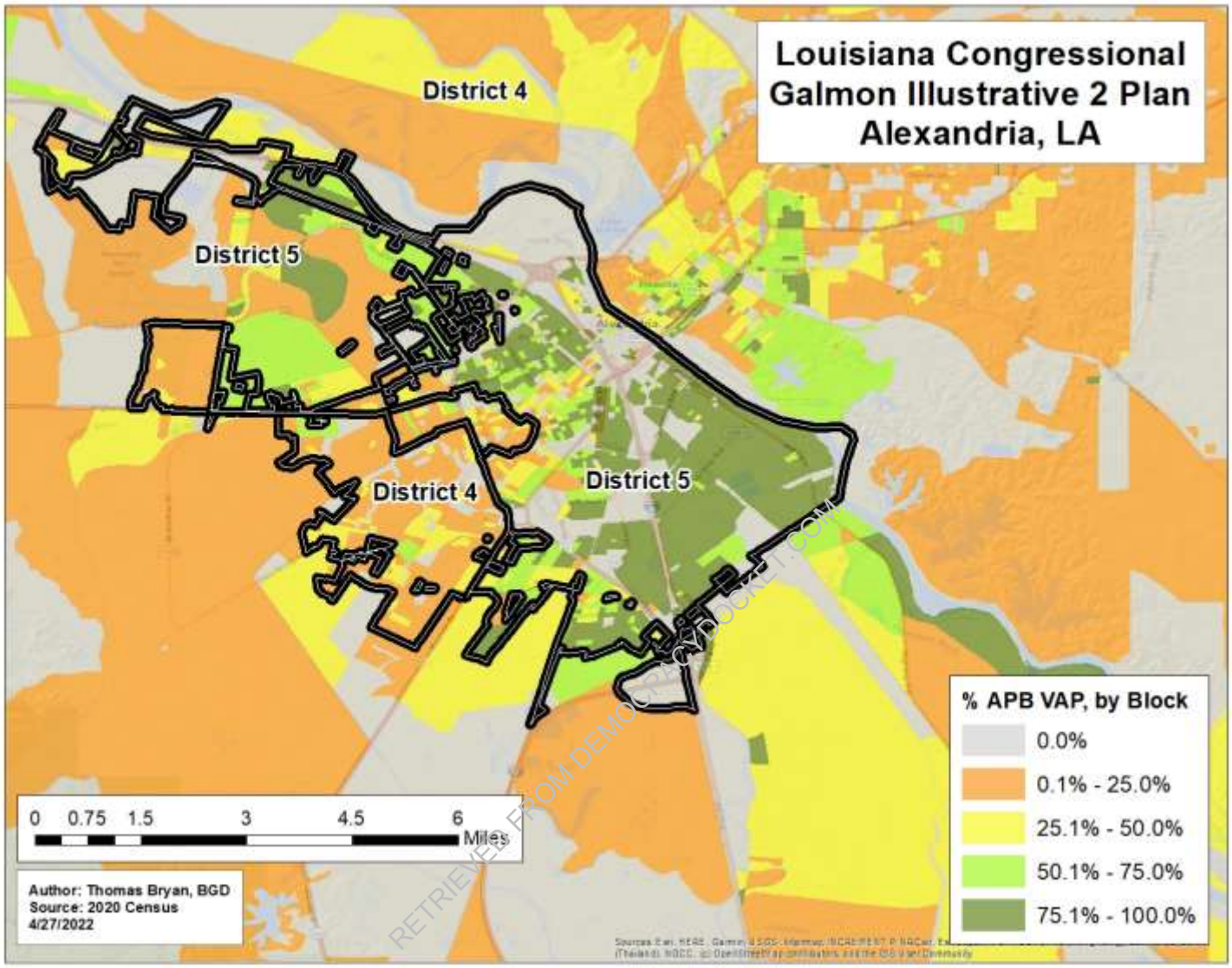
MM. Alexandria Galmon Illustrative 1 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

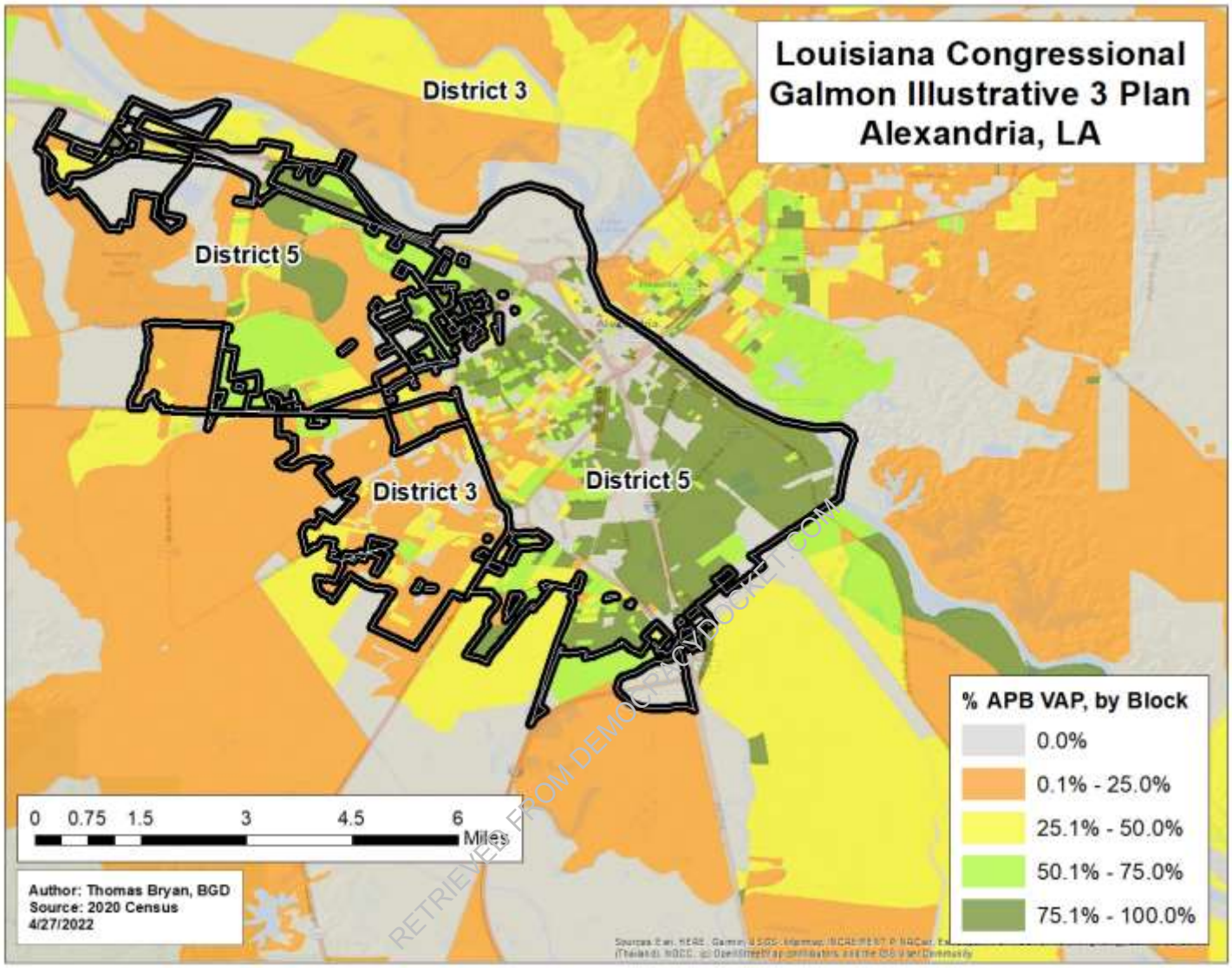
NN. Alexandria Galmon Illustrative 2 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

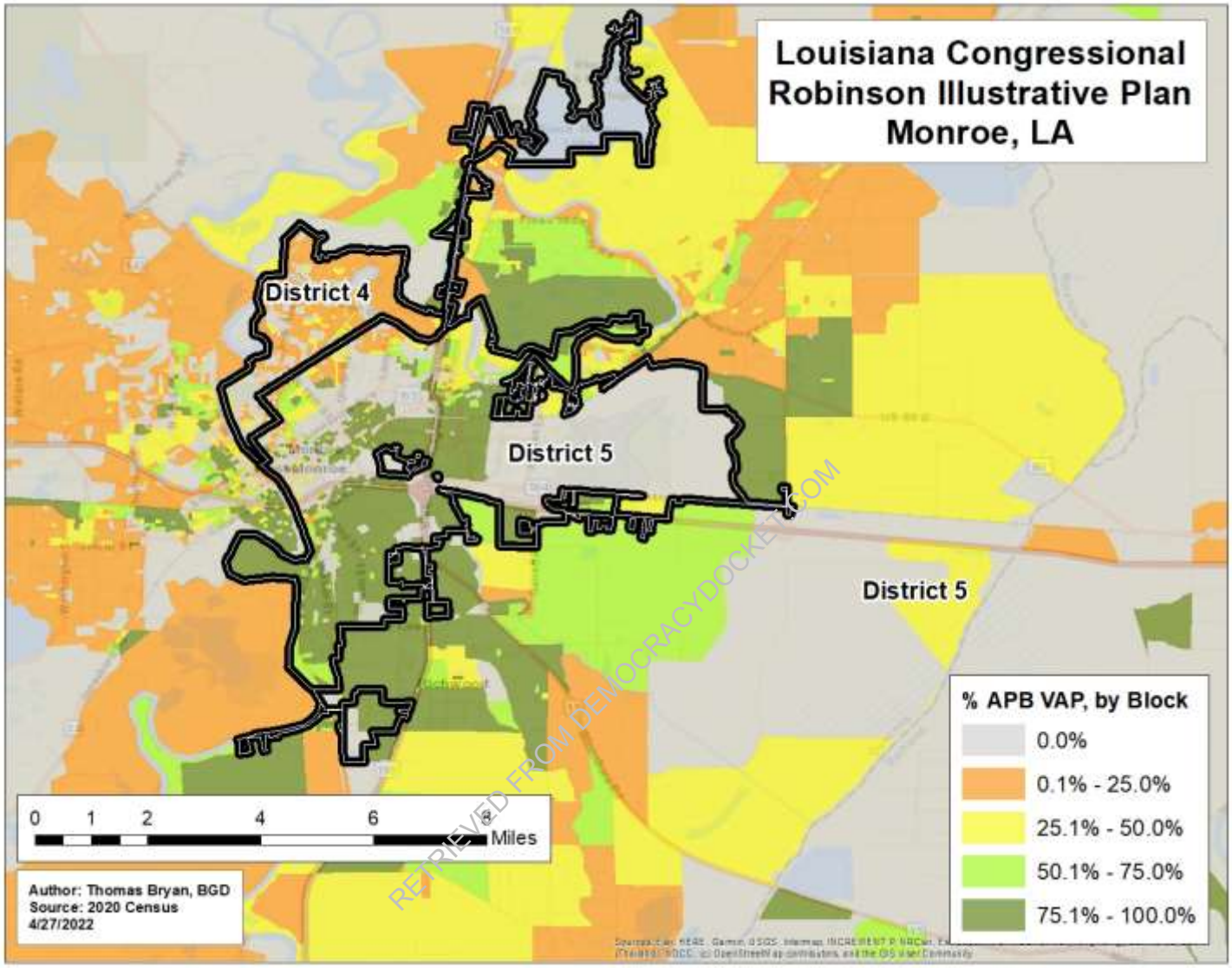
OO. Alexandria Galmon Illustrative 3 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

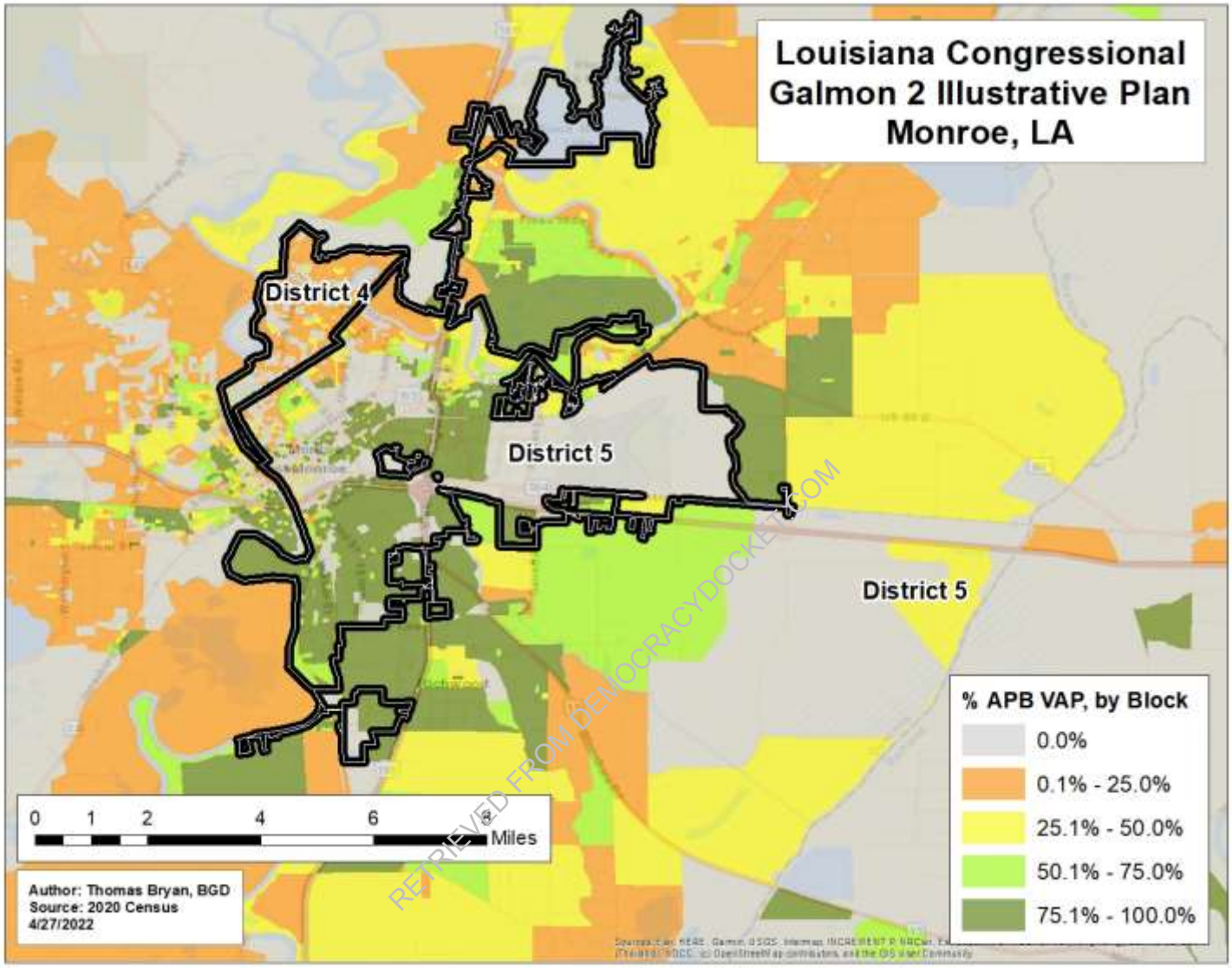
PP. Monroe Robinson Illustrative Plan Split by % Any Part Black VAP (the Enrolled Plan and Galmon Illustrative 1 Plan do not split Monroe)



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

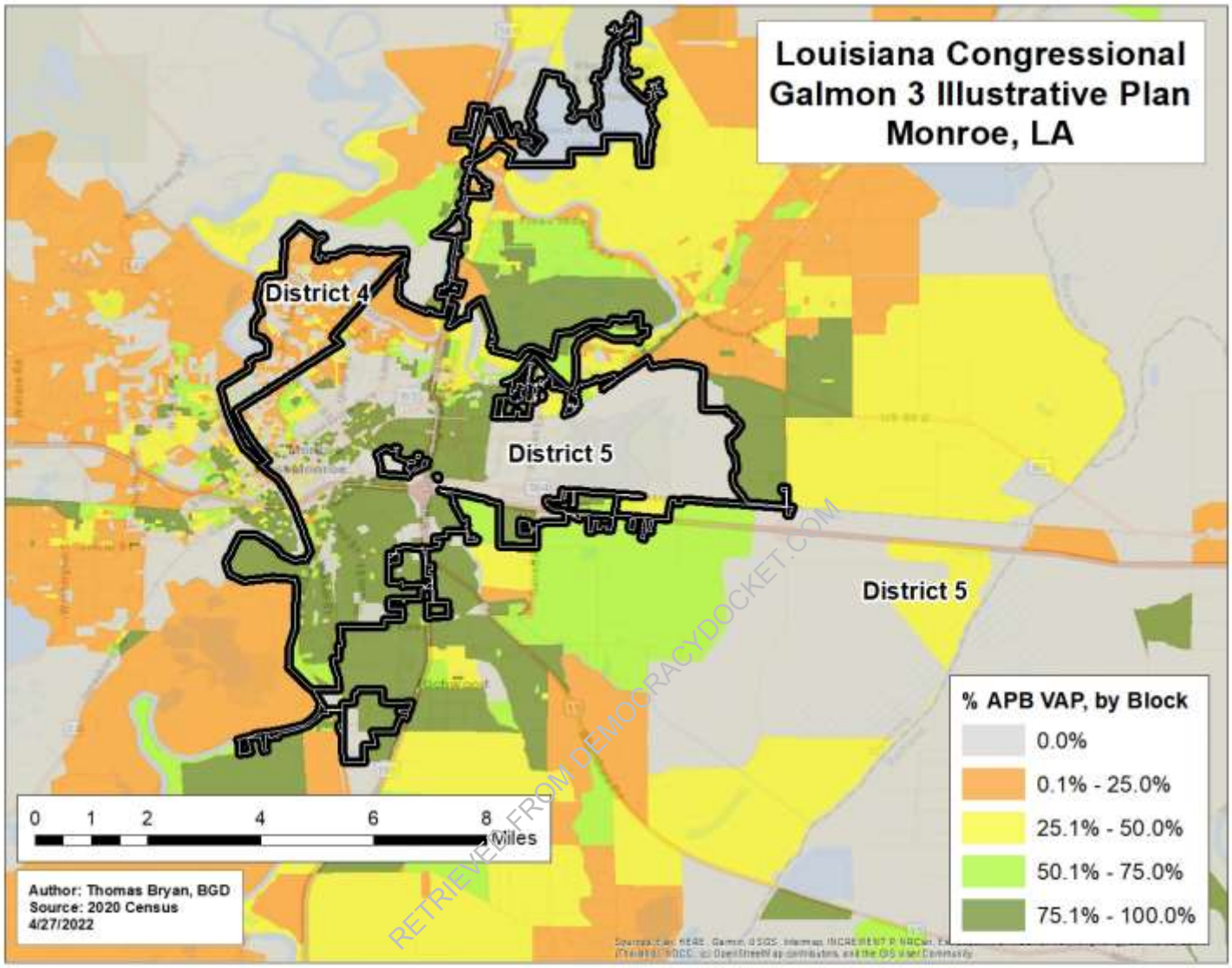
QQ. Monroe Galmon Illustrative 2 Plan Split by % Any Part Black VAP (the Galmon 1 Illustrative Plan does not split Monroe)



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

RR. Monroe Galmon Illustrative 3 Plan Split by % Any Part Black VAP



Note: The city boundary is extended through the middle of the city - following its division by the boundaries of the new plan. The line dividing the city is not an administrative boundary.

Shown by 2020 Census Block

Appendix 5 Thomas Bryan CV

Thomas M. Bryan

425-466-9749
tom@bryangeodemo.com

Introduction

I am an applied demographic, analytic and research professional who leads a team of experts in state and local redistricting cases. I have subject matter expertise in political and school redistricting and Voting Rights Act related litigation, US Census Bureau data, geographic information systems (GIS), applied demographic techniques and advanced analytics.

Education & Academic Honors

2002 MS, Management and Information Systems - George Washington University

2002 GSA CIO University graduate* - George Washington University

1997 Graduate credit courses taken at University of Nevada at Las Vegas

1996 MUS (Master of Urban Studies) Demography and Statistics core - Portland State University

1992 BS, History - Portland State University

Bryan GeoDemographics, January 2001-Current: Founder and Principal

I founded Bryan GeoDemographics (BGD) in 2001 as a demographic and analytic consultancy to meet the expanding demand for advanced analytic expertise in applied demographic research and analysis. Since then, my consultancy has broadened to include litigation support, state and local redistricting, school redistricting, and municipal infrastructure initiatives. Since 2001, BGD has undertaken over 150 such engagements in three broad areas:

1) state and local redistricting,
2) applied demographic studies, and
3) school redistricting and municipal Infrastructure analysis.

The core of the BGD consultancy has been in state and local redistricting and expert witness support of litigation. Engagements include:

Granted by the General Services Administration (GSA) and the Federal IT Workforce Committee of the CIO Council. http://www.gwu.edu/~mastergw/programs/mis/pr.html

State and Local Redistricting

- 2021: Retained as demographic and redistricting expert for the Wisconsin Legislature in *Johnson v. Wisconsin Elections Commission*, No. 2021AP001450-OA (Wis. Supreme Court) and related Wisconsin redistricting litigation. Offering opinions on demography and redistricting for redistricting plans proposed as remedies in impasse suit. The Wisconsin Supreme Court decided in favor of the Democratic Governor's plan on March 2, 2022. This decision was appealed to SCOTUS. On March 25, 2022 - SCOTUS returned the case to the Wisconsin Supreme Court. On April 16, 2022, the Wisconsin Supreme Court found in favor of the Wisconsin Legislative plan and the case was resolved.
    - https://www.wpr.org/us-supreme-court-rejects-legislative-map-drawn-evers-was-endorsed-wisconsin-supreme-court
    - https://www.nytimes.com/2022/04/15/us/wisconsin-districts-gerrymander-supreme-court.html

- 2021: Retained as demographic and redistricting expert by the State of Alabama Attorney General's office. Currently serving as the State's demographic and redistricting expert witness in the matters of *Milligan v. Merrill*, *Thomas v. Merrill* and *Singleton v. Merrill* over Alabama's Congressional redistricting initiatives. On January 24, 2022, a 3-judge district court found against the State of Alabama. The State of Alabama subsequently appealed to SCOTUS. On February 7, 2022 - SCOTUS put the lower courts decision on hold and agreed to hear the case. Outcome is pending.
    - https://www.nytimes.com/2022/02/07/us/politics/supreme-court-alabama-redistricting-congressional-map.html

- 2021: Retained as nonpartisan demographic and redistricting expert by counsel in the State of North Carolina to prepare commissioner redistricting plans for Granville County, Harnett County, Jones County and Nash County. Each proposed plan was approved and successfully adopted.

- 2021: Served as Consultant to the Arizona Independent Redistricting Commission, presenting "Pros and Cons of (Census data) Differential Privacy". July 13, 2021.
    - https://irc.az.gov/sites/default/files/meeting-agendas/Agenda%207.13.21.pdf

- 2021: Retained as demographic and redistricting expert by Democratic Counsel for the State of Illinois in the case of *McConchie v. State Board of Elections*. Prepared expert report in defense of using the American Community Survey to comply with state constitutional requirements in the absence of the (then) delayed Census 2020 data.
    - https://redistricting.lls.edu/case/mcconchie-v-ill-state-board-of-elections/.

- 2021: Retained by counsel for the Chairman and staff of the Texas House Committee on Redistricting as a consulting demographic expert. Texas House Bill 1 subsequently passed by the Legislature 83-63.
    - https://capitol.texas.gov/BillLookup/History.aspx?LegSess=873&Bill=HB1

- 2021: In the matter of the *State of Alabama, Representative Robert Aderholt, William Green and Camaran Williams v. the US Department of Commerce; Gina Raimondo; the US Census Bureau and Ron Jarmin* in US District Court of Alabama Eastern Division. Prepared a demographic report for Plaintiffs analyzing the effects of using Differential Privacy on Census Data in Alabama and was certified as an expert witness by the Court.
    - https://www.alabamaag.gov/Documents/news/Census%20Data%20Manipulation%20Lawsuit.pdf
    - https://redistricting.lls.edu/case/alabama-v-u-s-dept-of-commerce-ii/

- 2020: In the matter of The Christian Ministerial Alliance (CMA) v. *Arkansas Community Institute v. the State of Arkansas.* In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Providing demographic and analytic litigation support.
    - https://www.naacpldf.org/wp-content/uploads/CMA-v.-Arkansas_FILED-without-stamp.pdf

- 2020: In the matter of *Aguilar, Gutierrez, Montes, Palmer and OneAmerica v. Yakima County* in Superior Court of Washington under the Washington Voting Rights Act ("WVRA" Wash. Rev. Code § 29A.92.60). In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Providing demographic and analytic litigation support.
    - https://bloximages.newyork1.vip.townnews.com/yakimaherald.com/content/tncms/assets/v3/editorial/a/4e/a4e86167-95a2-5186-a86c-bb251bf535f1/5f0d01eec8234.pdf.pdf

- 2018-2020: In the matter of *Flores, Rene Flores, Maria Magdalena Hernandez, Magali Roman, Make the Road New York, and New York Communities for Change v. Town of Islip, Islip Town Board, Suffolk County Board of Elections* in US District Court. On behalf of Defendants - provided a critical analysis of plaintiff's demographic and environmental justice analysis. The critique revealed numerous flaws in both the demographic analysis as well as the tenets of their environmental justice argument, which were upheld by the court. Ultimately developed mutually agreed upon plan for districting.
    - https://nyelectionsnews.wordpress.com/2018/06/20/islip-faces-section-2-voting-rights-act-challenge/
    - https://www.courthousenews.com/wp-content/uploads/2018/06/islip-voting.pdf

- 2017-2020 In the matter of *NAACP, Spring Valley Branch; Julio Clerveaux; Chevon Dos Reis; Eric Goodwin; Jose Vitelio Gregorio; Dorothy Miller; and Hillary Moreau v East Ramapo Central School District (Defendant)* in United States District Court Southern District Of New York (original decision May 25, 2020), later the U.S. Second Circuit Court of Appeals. On behalf of Defendants, developed mutually agreed upon district plan and provided demographic and analytic litigation support.
    - https://www.lohud.com/story/news/education/2020/05/26/federal-judge-sides-naacp-east-ramapo-voting-rights-case/5259198002/

- 2017-2020: In the matter of *Pico Neighborhood Association et al v. City of Santa Monica* brought under the California VRA. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Providing demographic and analytic litigation support. Executed geospatial analysis to identify concentrations of Hispanic and Black CVAP to determine the impossibility of creating a majority minority district, and demographic analysis to show the dilution of Hispanic and Black voting strength in a district (vs at-large) system. Work contributed to Defendants prevailing in landmark ruling in the State of California Court of Appeal, Second Appellate District.
    - https://www.santamonica.gov/press/2020/07/09/santa-monica-s-at-large-election-system-affirmed-in-court-of-appeal-decision

- 2019: In the matter of *Johnson v. Ardoin / the State of Louisiana* in United States District Court. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided expert demographic and analytic litigation support.
    - https://www.brennancenter.org/sites/default/files/2019-10/2019-10-16-Johnson%20v_%20Ardoin-132-Brief%20in%20Opposition%20to%20MTS.pdf

- 2019: In the matter of *Suresh Kumar v. Frisco Independent School District et al*. in United States District Court. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided expert demographic and analytic litigation support. Successfully defended.
    - https://www.friscoisd.org/news/district-headlines/2020/08/04/frisco-isd-wins-voting-rights-lawsuit
    - https://www.courthousenews.com/wp-content/uploads/2020/08/texas-schools.pdf

- 2019: At the request of the City of Frisco, TX in collaboration with demographic testifying expert Dr. Peter Morrison. Provided expert demographic assessment of the City's potential liability regarding a potential Section 2 Voting Rights challenge.

- 2019: In the matter of *NAACP v. East Ramapo Central School District* in US District Court Southern District of NY. In collaboration with demographic testifying expert Dr. Peter

Morrison, on behalf of Defendants. Provided expert demographic and analytic litigation support.

- 2019: In the matter of *Johnson v. Ardoin* in United States District Court. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided expert demographic and analytic litigation support. Prepared analysis of institutionalized prison population versus noninstitutionalized eligible to vote population.
  - https://casetext.com/case/johnson-v-ardoin

- 2019: In the matter of *Vaughan v. Lewisville Independent School District et al.* in United States District Court. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided expert demographic and analytic litigation support.
  - https://www.nbcdfw.com/news/local/lawsuit-filed-against-lewisville-independent-school-district/1125/

- 2019: In the matter of *Holloway, et al. v. City of Virginia Beach* in United States District Court, Eastern District of Virginia. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided expert demographic and analytic litigation support.
  - https://campaignlegal.org/cases-actions/holloway-et-al-v-city-virginia-beach

- 2018: At the request of Kirkland City, Washington in collaboration with demographic testifying expert Dr. Peter Morrison. Performed demographic studies to inform the City's governing board's deliberations on whether to change from at-large to single-member district elections following enactment of the Washington Voting Rights Act. Analyses included gauging the voting strength of the City's Asian voters and forming an illustrative district concentrating Asians; and compared minority population concentration in pre- and post-annexation city territory.
  - https://www.kirklandwa.gov/Assets/City+Council/Council+Packets/021919/8b_SpecialPresentations.pdf#:~:text=RECOMMENDATION%3A%20It%20is%20recommended%20that%20City%20Council%20receive,its%20Councilmembers%20on%20a%20citywide%2C%20at-%20large%20basis

- 2018: At the request of Tacoma WA Public Schools in collaboration with demographic testifying expert Dr. Peter Morrison. Created draft concept redistricting plans that would optimize minority population concentrations while respecting incumbency. Client will use this plan as a point of departure for negotiating final boundaries among incumbent elected officials.

- 2018: At the request of the City of Mount Vernon, Washington., in collaboration with demographic testifying expert Dr. Peter Morrison. Prepared a numerous draft concept plans

that preserves Hispanics' CVAP concentration. Client utilized draft concept redistricting plans to work with elected officials and community to agree upon the boundaries of six other districts to establish a proposed new seven-district single-member district plan.

- 2017: In the matter of *Pico Neighborhood Association v. City of Santa Monica*. In collaboration with demographic testifying expert Dr. Peter Morrison. Worked to create draft district concept plans that would satisfy Plaintiff's claim of being able to create a majority-minority district to satisfy Gingles prong 1. Such district was not possible, and the Plaintiffs case ultimately failed in California State Court of Appeals Second Appellate District.
  - https://law.justia.com/cases/california/court-of-appeal/2020/b295935.html

- 2017: In the matter of *John Hall, Elaine Robinson-Strayhorn, Lindora Toudle, Thomas Jerkins, v. Jones County Board of Commissioners*. In collaboration with demographic testifying expert Dr. Peter Morrison. Worked to create draft district concept plans to resolve claims of discrimination against African Americans attributable to the existing at-large voting system.
  - http://jonescountync.gov/vertical/sites/%7B9E2432B0-642B-4C2F-A31B-CDE7082E88E9%7D/uploads/2017-02-13-Jones-County-Complaint.pdf

- 2017: In the matter of *Harding v. County of Dallas* in U.S. District Court. In collaboration with demographic testifying expert Dr. Peter Morrison. In a novel case alleging discrimination *against* white, non-Hispanics under the VRA, I was retained by plaintiffs to create redistricting scenarios with different balances of white non-Hispanics, Blacks and Hispanics. Deposed and provided expert testimony on the case.
  - https://www.courthousenews.com/wp-content/uploads/2018/08/DallasVoters.pdf

- 2016: Retained by The Equal Voting Rights Institute to evaluate the Dallas County Commissioner existing enacted redistricting plan. In collaboration with demographic testifying expert Dr. Peter Morrison, the focus of our evaluation was twofold: (1) assess the failure of the Enacted Plan (EP) to meet established legal standards and its disregard of traditional redistricting criteria; (2) the possibility of drawing an alternative Remedial Plan (RP) that did meet established legal standards and balance traditional redistricting criteria.
  - http://equalvotingrights.org/wp-content/uploads/2015/01/Complaint.pdf

- 2016: In the matter of *Jain v. Coppell ISD et al* in US District Court. In collaboration with demographic testifying expert Dr. Peter Morrison. Consulted in defense of Coppell Independent School District (Dallas County, TX) to resolve claims of discriminatory at-large voting system affecting Asian Americans. While Asians were shown to be sufficiently numerous, I was able to demonstrate that they were not geographically concentrated - thus successfully proving the Gingles 1 precondition could not be met resulting the complaint being withdrawn.
  - https://dockets.justia.com/docket/texas/txndce/3:2016cv02702/279616

- 2016: In the matter of *Feldman et al v. Arizona Secretary of State's Office et al* in SCOTUS. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided analytics on the locations and proximal demographics of polling stations that had been closed subsequent to *Shelby County v. Holder* (2013) which eliminated the requirement of state and local governments to obtain federal preclearance before implementing any changes to their voting laws or practices. Subsequently provided expert point of view on disparate impact as a result of H.B. 2023. Advised Maricopa County officials and lead counsel on remediation options for primary polling place closures in preparation for 2016 elections.
    - https://arizonadailyindependent.com/2016/04/05/doj-wants-information-on-maricopa-county-election-day-disaster/
    - https://www.supremecourt.gov/DocketPDF/19/19-1257/142431/20200427105601341_Brnovich%20Petition.pdf

- 2016: In the matter of *Glatt v. City of Pasco, et al.* in US District Court (Washington). In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Provided analytics and draft plans in defense of the City of Pasco. One draft plan was adopted, changing the Pasco electoral system from at-large to a six-district + one at large.
    - https://www.pasco-wa.gov/DocumentCenter/View/58084/Glatt-v-Pasco---Order---January-27-2017?bidId=
    - https://www.pasco-wa.gov/923/City-Council-Election-System

- 2015: In the matter of *The League of Women Voters et al. v. Ken Detzner et al* in the Florida Supreme Court. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Performed a critical review of Florida state redistricting plan and developed numerous draft concept plans.
    - http://www.miamiherald.com/news/politics-government/state-politics/article47576450.html
    - https://www.floridasupremecourt.org/content/download/322990/2897332/file/OP-SC14-1905_LEAGUE%20OF%20WOMEN%20VOTERS_JULY09.pdf

- 2015: In the matter of *Evenwel, et al. v. Abbott / State of Texas* in SCOTUS. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Plaintiffs. Successfully drew map for the State of Texas balancing both total population from the decennial census and citizen population from the ACS (thereby proving that this was possible). We believe this may be the first and still only time this technical accomplishment has been achieved in the nation at a state level. Coauthored SCOTUS Amicus Brief of Demographers.
    - https://www.supremecourt.gov/opinions/15pdf/14-940_ed9g.pdf

- https://www.scotusblog.com/wp-content/uploads/2015/08/Demographers-Amicus.pdf

- 2015: In the matter of *Ramos v. Carrollton-Farmers Branch Independent School District* in US District Court (Texas). In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Used 2009-2013 5-year ACS data to generate small-area estimates of minority citizen voting age populations and create a variety of draft concept redistricting plans. Case was settled decision in favor of a novel cumulative voting system.
  - https://starlocalmedia.com/carrolltonleader/c-fb-isd-approves-settlement-in-voting-rights-lawsuit/article_92c256b2-6e51-11e5-adde-a70cbe6f9491.html

- 2015: In the matter of *Glatt v. City of Pasco et al.* in US District Court (Washington). In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Consulted on forming new redistricting plan for city council review. One draft concept plan was agreed to and adopted.
  - https://www.pasco-wa.gov/923/City-Council-Election-System

- 2015: At the request of Waterbury, Connecticut, in collaboration with demographic testifying expert Dr. Peter Morrison. As a result of a successful ballot measure to convert Waterbury from an at-large to a 5-district representative system, consulted an extensive public outreach and drafted numerous concept plans. The Waterbury Public Commission considered alternatives and recommended one of our plans, which the City adopted.
  - http://www.waterburyobserver.org/wod7/node/4124

- 2014-15: In the matter of *Montes v. City of Yakima* in US District Court (Washington). In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants. Analytics later used to support the Amicus Brief of the City of Yakima, Washington in the U.S. Supreme Court in *Evenwel v. Abbott*.
  - https://casetext.com/case/montes-v-city-of-yakima-3

- 2014: In the matter of *Harding v. County of Dallas* in the US Court of Appeals Fifth Circuit. In the novel case of Anglo plaintiffs attempting to claim relief as protected minorities under the VRA. Served as demographic expert in the sole and limited capacity of proving Plaintiff claim under Gingles prong 1. Claim was proven. Gingles prongs 2 and 3 were not and the case failed.
  - https://electionlawblog.org/wp-content/uploads/Dallas-opinion.pdf

- 2014: At the request of Gulf County, Florida in collaboration with demographic testifying expert Dr. Peter Morrison. Upon the decision of the Florida Attorney General to force inclusion of prisoners in redistricting plans – drafted numerous concept plans for the Gulf County Board of County Commissioners, one of which was adopted.

- http://myfloridalegal.com/ago.nsf/Opinions/B640990E9817C5AB85256A9C00631387

- 2012-2015: In the matter of *GALEO and the City of Gainesville* in Georgia. In collaboration with demographic testifying expert Dr. Peter Morrison, on behalf of Defendants -consulted on defense of existing at-large city council election system.
  - http://atlantaprogressivenews.com/2015/06/06/galeo-challenges-at-large-voting-in-city-of-gainesville/

- 2012-: Confidential. Consulted (through Morrison & Associates) to support plan evaluation, litigation, and outreach to city and elected officials (1990s - mid-2000s). Executed first statistical analysis of the American Community Survey to determine probabilities of minority-majority populations in split statistical/administrative units of geography, as well as the cumulative probabilities of a "false-negative" minority-majority reading among multiple districts.

- 2011-: Confidential. Consulted on behalf of plaintiffs in Committee (Private) vs. State Board of Elections pertaining to citizen voting-age population. Evaluated testimony of defense expert, which included a statistical evaluation of Hispanic estimates based on American Community Survey (ACS) estimates. Analysis discredited the defendant's expert's analysis and interpretation of the ACS.

School Redistricting and Municipal Infrastructure Projects

BGD worked with McKibben Demographics from 2004-2012 providing expert demographic and analytic support. These engagements involved developing demographic profiles of small areas to assist in building fertility, mortality and migration models used to support long-range population forecasts and infrastructure analysis in the following communities:

Fargo, ND 10/2012
Columbia, SC 3/2012
Madison, MS 9/2011
Rockwood, MO 3/2011
Carthage, NY 3/2011
NW Allen, IN 9/2010
Fayetteville, AR 7/2010
Atlanta, GA 2/2010
Caston School Corp., IN 12/09
Rochester, IN 12/09
Urbana, IL 11/09
Dekalb, IL 11/09
Union County, NC 11/09
South Bend, IN 8/09
Lafayette, LA 8/09
Fayetteville, AR 4/09
New Orleans, LA 4/09
Wilmington New Hanover 3/09
New Berry, SC 12/08
Corning, NY 11/08
McLean, IL 11/08
Lakota 11/08
Greensboro, NC 11/08
Charleston, SC 8/08
Woodland, IL 7/08
White County, IN 6/08
Gurnee District 56, IL 5/08
Central Noble, IN 4/08
Charleston First Baptist, SC 4/08
Edmond, OK 4/08
East Noble, IN 3/08
Mill Creek, IN 5/06
Rhode Island 5/06
Garrett, IN 3/08
Meridian, MS 3/08
Madison County, MS 3/08
Charleston 12/07
Champaign, IL 11/07
Richland County, SC 11/07
Lake Central, IN 11/07
Columbia, SC 11/07
Duneland, IN 10/07
Union County, NC 9/07
Griffith, IN 9/07
Rensselaer, IN 7/07
Hobart, IN 7/07

Guilford 9/08

Lexington, SC 9/08

Plymouth, IN 9/08

Buffalo, NY 7/07

Oak Ridge, TN 5/07

Westerville, OH 4/07

Projects Continued

Baton Rouge, LA 4/07

Cobb County, GA 4/07

Charleston, SC District 20 4/07

McDowell County, NC 4/07

East Allen, IN 3/07

Mt. Pleasant, SC District 2 2/07

Peach County, GA 2/07

North Charleston, SC District 4 2/07

Madison County, MS revisions 1/07

Portage County, IN 1/07

Marietta, GA 1/07

Porter, IN 12/06

Harrison County, MS 9/06

New Albany/Floyd County, IN 9/06

North Charleston, SC 9/06

Fairfax, VA 9/06

Coleman 8/06

DeKalb, GA 8/06

LaPorte, IN 7/06

NW Allen, IN 7/06

Brunswick, NC 7/06

Carmel Clay, IN 7/06

Calhoun, SC 5/06

Hamilton Community Schools, IN 4/06

Dilworth, MN 4/06

Hamilton, OH 2/06

Allen County 11/05

Bremen, IN 11/05

Smith Green, IN 11/05

Steuben, IN 11/05

Plymouth, IN 11/05

North Charleston, SC 11/05

Huntsville, AL 10/05

Dekalb, IN 9/05

East Noble, IN 9/05

Valparaiso, IN 6/05

Penn-Harris-Madison, IN 7/05

Elmira, NY 7/05

South Porter/Merriville, IN 7/05

Fargo, ND 6/05

Washington, IL 5/05

Addison, NY 5/05

Kershaw, SC 5/05

Porter Township, IN 3/05

Portage, WI 1/05

East Stroudsburg, PA 12/04

North Hendricks, IN 12/04

Sampson/Clinton, NC 11/04

Carmel Clay Township, IN 9/04

SW Allen County, IN 9/04

East Porter, IN 9/04

Allen County, IN 9/04

Duplin, NC 9/04

West Noble, IN 2/06

New Orleans, LA 2/06

Norwell, IN 2/06

Middletown, OH 12/05

West Noble, IN 11/05

Madison, MS 11/05

Fremont, IN 11/05

Concord, IN 11/05

Hamilton County / Clay TSP, IN 9/04

Hamilton County / Fall Creek TSP, IN 9/04

Decatur, IN 9/04

Chatham County / Savannah, GA 8/04

Evansville, IN 7/04

Madison, MS 7/04

Vanderburgh, IN 7/04

New Albany, IN 6/04

Publications

- In the matter of *Banerian v. Benson*, No. 1:22-CV-00054-RMK-JTN-PLM, in US District Court of the Western District of Michigan. Assessing the performance of plaintiff and defendant plans against the Michigan Constitution and traditional redistricting principles.

- In the matter of *Johnson v. Wisconsin Elections Commission*, No. 2021AP001450OA, in the Supreme Court of Wisconsin. Assessing the features of proposed redistricting plans by the Wisconsin Legislature and other parties to the litigation. December 2021.

- In the matters of *Caster v. Merrill* and *Milligan v. Merrill* in US District Court of the Northern District of Alabama. Civil Action NOs. 2:21-cv-01536-AMM; 2:21-cv-01530-AMM. Declaration of Thomas Bryan. Assessing the compliance and performance of the demonstrative VRA congressional plans of Dr. Moon Duchin and Mr. William Cooper. December 2021.

- In the matter of *Milligan v. Merrill* in US District Court of the Northern District of Alabama. Civil Action NO. 2:21-cv-01530-AMM. Declaration of Thomas Bryan. Assessing the compliance and performance of the Milligan and State of Alabama congressional redistricting plans. December 2021.

- In the matter of *Singleton v. Merrill* in US District Court of the Northern District of Alabama. Civil Action NO. 2:21-cv-01291-AMM. Declaration of Thomas Bryan. Assessing the compliance and performance of the Singleton and State of Alabama congressional redistricting plans. December 2021.

- "The Effect of the Differential Privacy Disclosure Avoidance System Proposed by the Census Bureau on 2020 Census Products: Four Case Studies of Census Blocks in Alaska" PAA Affairs, (with D. Swanson and Richard Sewell, Alaska Department of Transportation and Public Facilities). March 2021.
    - https://www.populationassociation.org/blogs/paa-web1/2021/03/30/the-effect-of-the-differential-privacy-disclosure?CommunityKey=a7bf5d77-d09b-4907-9e17-468af4bdf4a6 .
    - https://redistrictingonline.org/2021/03/31/study-census-bureaus-differential-privacy-disclosure-avoidance-system-produces-produces-concerning-results-for-local-jurisdictions/
    - https://www.ncsl.org/research/redistricting/differential-privacy-for-census-data-explained.aspx

- In the matter of the *State of Alabama, Representative Robert Aderholt, William Green and Camaran Williams v. the US Department of Commerce; Gina Raimondo; the US Census Bureau*

and Ron Jarmin in US District Court of Alabama Eastern Division. Declaration of Thomas Bryan, Exhibit 6. Civil Action NO. 3:21-CV-211, United States District Court for Middle Alabama, Eastern Division. Assessing the impact of the U.S. Census Bureau's approach to ensuring respondent privacy and Title XIII compliance by using a disclosure avoidance system involving differential privacy. March 2021.

- https://redistricting.lls.edu/wp-content/uploads/AL-commerce2-20210311-PI.zip

- Peter A. Morrison and Thomas M. Bryan, Redistricting: A Manual for Analysts, Practitioners, and Citizens (2019). Springer Press: Cham Switzerland.

- "Small Area Business Demography." in D. Poston (editor) Handbook of Population, 2nd Edition. (2019). Springer Press: London (with P. Morrison and S. Smith).

- "From Legal Theory to Practical Application: A How-To for Performing Vote Dilution Analyses." *Social Science Quarterly*. (with M.V. Hood III and Peter Morrison). March 2017
  - http://onlinelibrary.wiley.com/doi/10.1111/ssqu.12405/abstract

- In the Supreme Court of the United States Sue Evenwel, Et Al., *Appellants,* V. Greg Abbott, in his official capacity as Governor of Texas, et al., *Appellees. On appeal from the United States District Court for the Western District of Texas.* Amicus *Brief of Demographers Peter A. Morrison, Thomas M. Bryan, William A. V. Clark, Jacob S. Siegel, David A. Swanson, and The Pacific Research Institute* - As *amici curiae* in support of Appellants. August 2015.
  - www.scotusblog.com/wp-content/uploads/2015/08/Demographers-Amicus.pdf)

- Workshop on the Benefits (and Burdens) of the American Community Survey, Case Studies/Agenda Book 6 "Gauging Hispanics' Effective Voting Strength in Proposed Redistricting Plans: Lessons Learned Using ACS Data." June 14–15, 2012
  - http://docplayer.net/8501224-Case-studies-and-user-profiles.html

- "Internal and Short Distance Migration" by Bryan, Thomas in J. Siegel and D. Swanson (eds.) The Methods and Materials of Demography, Condensed Edition, Revised. (2004). Academic/Elsevier Press: Los Angeles (with D. Swanson and P. Morrison).

- "Population Estimates" by Bryan, Thomas in J. Siegel and D. Swanson (eds.) The Methods and Materials of Demography, Condensed Edition, Revised. (2004). Academic/Elsevier Press: Los Angeles (with D. Swanson and P. Morrison).

- Bryan, T. (2000). U.S. Census Bureau Population estimates and evaluation with loss functions. *Statistics in Transition,* 4, 537–549.

Professional Presentations and Conference Participation

- "Redistricting 101: A Tutorial" 2022 Population Association of America Applied Demography Conference, February 2022. With Dr. Peter Morrison.

- Session Chairman on Invited Session "Assessing the Quality of the 2020 Census", including Census Director Ron Jarmin at the 2020 Population Association of America meeting May 5, 2021.
    - https://paa2021.secure-platform.com/a/organizations/main/home

- "The Effect of the Differential Privacy Disclosure Avoidance System Proposed by the Census Bureau on 2020 Census Products: Four Case Studies of Census Blocks in Alaska". 2021 American Statistical Association - Symposium on Data Science and Statistics (ASA-SDSS). With Dr. David Swanson.
    - https://ww2.amstat.org/meetings/sdss/2021/index.cfm

- "New Technical Challenges in Post-2020 Redistricting" 2020 Population Association of America Applied Demography Conference, 2020 Census Related Issues, February 2021. With Dr. Peter Morrison.
    - https://www.youtube.com/watch?v=ETvvoECt9sc&feature=youtu.be

- "Tutorial on Local Redistricting" 2020 Population Association of America Applied Demography Conference, February 2021. With Dr. Peter Morrison.
    - https://www.youtube.com/watch?v=ETvvoECt9sc&feature=youtu.be

- "Demographic Constraints on Minority Voting Strength in Local Redistricting Contexts" 2019 Southern Demographic Association meetings (coauthored with Dr. Peter Morrison) New Orleans, LA, October 2019. Winner of annual E. Walter Terrie award for best state and local demography presentation.
    - http://sda-demography.org/2019-new-orleans

- "Applications of Big Demographic Data in Running Local Elections" 2017 Population and Public Policy Conference, Houston, TX.

- "Distinguishing 'False Positives' Among Majority-Minority Election Districts in Statewide Congressional Redistricting," 2017 Southern Demographic Association meetings (coauthored with Dr. Peter Morrison) Morgantown, WV.

- "Devising a Demographic Accounting Model for Class Action Litigation: An Instructional Case" 2016 Southern Demographic Association (with Peter Morrison), Athens, GA.

- "Gauging Hispanics' Effective Voting Strength in Proposed Redistricting Plans: Lessons Learned Using ACS Data." 2012 Conference of the Southern Demographic Association, Williamsburg, VA.

- "Characteristics of the Arab-American Population from Census 2000 and 1990: Detailed Findings from PUMS." 2004 Conference of the Southern Demographic Association, (with Samia El-Badry) Hilton Head, SC.

- "Small-Area Identification of Arab American Populations," 2004 Conference of the Southern Demographic Association, Hilton Head, SC.

- "Applied Demography in Action: A Case Study of Population Identification." 2002 Conference of the Population Association of America, Atlanta, GA.

Primary Software Competencies

ESRI ArcGIS: advanced

SAS: intermediate

Microsoft Office: advanced

Professional Affiliations

International Association of Applied Demographers (Member and Board of Directors)

American Statistical Association (Member)

Population Association of America (Member)

Southern Demographic Association (Member)

American BAR Association (Affiliated Professional: Solo, Small Firm and General Practice Division)

Relevant Work Experience

January 2001- April 2003 ESRI Business Information Solutions / Demographer

Responsibilities included demographic data management, small-area population forecasting, IS management and software product and specification development. Additional responsibilities included developing GIS-based models of business and population forecasting, and analysis of emerging technology and R&D / testing of new GIS and geostatistical software.

May 1998-January 2001 U.S. Census Bureau / Statistician

Responsibilities: developed and refined small area population and housing unit estimates and innovative statistical error measurement techniques, such as Loss Functions and MAPE-R.

Service

Eagle Scout, 1988, Boy Scouts of America. Member of the National Eagle Scout Association. Involved in leadership of the Boy Scouts of America Heart of Virginia Council.

References

Dr. David Swanson
Professional Peer
david.swanson@ucr.edu
951-534-6336

Dr. Peter Morrison
Professional Peer
petermorrison@me.com
310-266-9580

EXHIBIT B

Expert Report of Dr. Alan Murray
Expert in Spatial Geography for the
Louisiana Attorney General

Robinson v. Ardoin

and

Galmon v. Ardoin

April 29, 2022

EXPERT REPORT OF DR. ALAN MURRAY

I, Alan Murray, affirm the conclusions I express in this report are provided to a reasonable degree of professional certainty.

EXPERT QUALIFICATIONS

I am an expert in spatial analytics with 30+ years of experience. Described more fully below, I have been retained by the Louisiana Attorney General's office as an expert to provide redistricting analysis related to State Congressional, State Senate and State Legislative redistricting plans.

I am a Professor in the Department of Geography at University of California at Santa Barbara, with previous appointments at Ohio State University, Arizona State University and Drexel University. I have a Bachelor of Science in Mathematics (1990), a Master's in Statistics and Applied Probability (1992) and a Ph.D. in Geography (1995), all from the University of California, Santa Barbara.

My expertise is in the use and development of spatial analytics and GIS to address a range of substantive issues in population/demographics, equity, safety, health, land use, planning and public policy. I teach courses on: Technical issues in GIS, Locational Analysis, Spatial Statistics and Urban and Environmental Decision Making.

I have authored three books, 287 articles/book chapters/proceedings supported by over $7 million in competitive research funding. My research has been cited 16,590 times to date (GoogleScholar), with an h-index of 71 (meaning that 71 articles have been cited at least 71 times). I have received a number of awards and distinctions to date, including:

- Fellow of the American Association for the Advancement of Science
- Fellow of the Regional Science Association International
- Alonso Memorial Prize for Innovative Work in Regional Science, North American Regional Science Council
- Isard Award for Scholarly Achievement, North American Regional Science Council
- Hewings Award for Outstanding Young Scholar, North American Regional Science Council.

My consulting experience has included geographic socio-economic and demographic analysis in the areas of districting, crime, transit, homelessness and emergency response, primarily. In particular, work for the Lima Policy Department (2000-2001) examining spatial patterns of crime and subsequent analysis for the Hamilton County (Ohio) Prosecutor's Office (2005) followed by expert testimony in John Doe vs. Jim Petro et al. (2005), United States District Court for the Southern District of Ohio, Western Division (Case No. 1:05-CV-125). In 2006 I carried out service response districting efforts for the Elk Grove CSD Fire Department, and in 2010-11 undertook school districting analysis for Hillsborough County Public Schools through Seer Analytics. Recent activities include on demand service districting for Southwest Ohio Regional Transit Authority

through Alfred Benesch & Associates (2021-present) as well as spatial analytics for BryanGeoDemographics (2021-present), among others.

My full CV, including my 30+ years of spatial analytics, is attached as Appendix 1.

I am being compensated at my customary rate of $250/hour. My compensation is not dependent on my conclusions or opinions.

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

1. I was engaged by the Louisiana Attorney General's office to assess the characteristics of five Congressional redistricting plans and to determine the spatial distribution of the Black population in Louisiana, and whether it was distributed or clustered differently than the white population.

2. In this report, I explore the question of minority-majority spatial distributions, and whether there Black and white populations within the state exhibit co-variability. This is done using 2020 US Census data at the block level, focusing on Voting Age Populations of Black and white individuals across Louisiana.

3. The analysis finds that there are widespread and significant instances of clustering in the concentrations of white voting age population, resulting in neighborhood level majorities. Similarly, there are widespread and significant instances of clustering in the concentrations of Black voting age population, resulting in neighborhood level majorities. These clusters are however, far apart from each other in many instances.

4. This is confirmed through spatial statistical analysis. Particularly evident is the low number and/or concentration of Blacks in rural areas across the state and conversely the higher concentration of whites in rural areas.

5. Based on differences in the percentage concentration of each Census block, the clustering of high percentages of whites across the state is pronounced as is the clustering of low percentages. This is also true for Blacks across the state, with blocks of high percentages of Blacks across the state forming notable clusters and blocks of low percentages of Blacks also forming significant clusters.

6. Summaries for select cities, Alexandria, Baton Rouge, New Orleans, Lafayette, Monroe and Shreveport, highlight the differences in white and Black voting age populations within urban areas. There are notable shifts in the spatial concentrations of white and Black populations.

7. The implications of the spatial analysis are clear. The geographic distribution of white voting age populations is fundamentally different from the geographic distribution of Black voting age population, and the Black voting age population clusters are often not close together.

II. ASSIGNMENT

8. The Louisiana Attorney General has asked me to determine the spatial distribution of the Black population in Louisiana, whether it was distributed or clustered differently than the white population, and whether clusters of Black population are compact with each other.

9. In Section III, I present my spatial autocorrelation methodology (at A), my Louisiana statewide findings (at B) and my sub-state findings (at C).

10. In Section IV, I present my conclusions.

11. In forming my opinions, I have considered all materials cited in this report and the appendices. I have also considered some pleadings and other filings in this matter; as well as technical resources such as Morrison & Bryan, Redistricting: A Manual for Analysts, Practitioners, & Citizens (Springer 2019) and the U.S. DOJ, Guidance under Section 2 of the Voting Rights Act, 52 U.S.C. 1301, for redistricting and methods of electing government bodies (Sept. 1, 2021).

12. I reserve the right to further supplement my report and opinions.

III. Louisiana Racial Spatial Geography

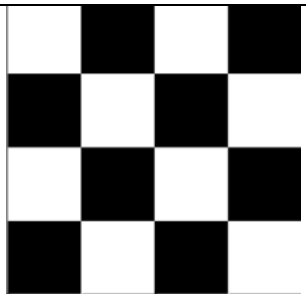
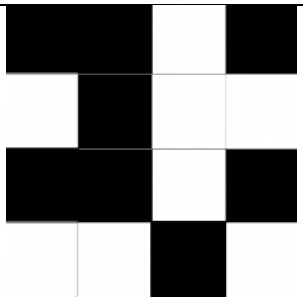
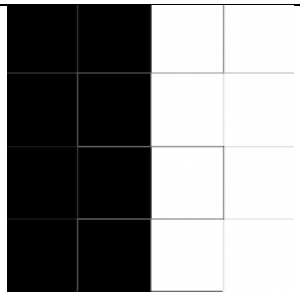
A. Geospatial Analysis

The analysis is premised geographic similarities and differences between two racial groups, as this is meaningful to redistricting efforts. In order to understand whether the Black voting age population is distributed differently than the white voting age population in Louisiana, a statistical technique called spatial autocorrelation is relied upon along with a measure of spatial centrality known as the weighted centroid. Spatial autocorrelation is multi-directional and multi-dimensional, making it useful for finding patterns in complicated geographic data. It is similar to the notion of correlation, but extends this by accounting for the deviation of a block and its neighbors. Traditional statistical correlation measures, like Pearson's, assume independence between Census blocks. However, it is well known that this assumption in violated in for spatial attributes, and Census counts in particular. That is, the attribute value for a given block (population) is generally similar in value to neighboring block attribute values. This is a property known as the First Law of Geography, or Tobler's Law, observing that nearby things are more related than thing further away. The Global Moran's I statistic was developed precisely to account for a lack of independence in spatial observations (blocks). Global Moran's I is a measure that reflects the overall spatial autocorrelation of an attribute value (population) across a region (state of Louisiana), and ranges in value between [-1, +1]. It measures how one Census block attribute is similar to attributes of blocks surrounding it. If neighboring observations are systematically similar each other, then they are not independent. Conversely, if neighboring observations are systematically not similar to each, then they are also not independent. Moran's I is one approach to statically measure and test for spatial autocorrelation.

- -1 is clustering of dissimilar values
- 0 is no clustering (randomness in block values)
- +1 indicates clustering of similar values (like valued blocks surrounding each other)

One can conceptualize what is happening with the Moran's I measure of spatial autocorrelation in Figure III.A.1.

Figure III.A.1 Moran's I Spatial Clustering Examples

Perfect Dispersion	Perfect Randomness	Perfect Clustering
		
In the above image, the black and white squares have a definite pattern and are perfectly dispersed. The Moran's value would equal -1.	If the squares were truly randomly dispersed, the Moran's value would be 0.	This is perfect clustering of similar values, which gives a Moran value of +1.

There are a number of methods for assessing spatial autocorrelation [1], but Moran's I is one of the most preferred givens it interpretability and comparability. If blocks are referred to by the index i, then the variable y_i can be used to reference the attribute value of block i. The global Moran's I is then defined as:

$$I = \frac{n \sum_i \sum_j w_{ij}(y_i - \bar{y})(y_j - \bar{y})}{(\sum_i \sum_j w_{ij}) \sum_i (y_i - \bar{y})^2}$$

where n is the number of blocks, w_{ij} is 1 if blocks i and j are neighbors, and $\bar{y}$ is the mean of attribute values (e.g., $y = \frac{\sum_i y_i}{n}$). A second measure of spatial autocorrelation was also evaluated, Geary's c, but is not described or reported because of similarity in findings.

While the Global Moran's I is informative, it does not identify specific instances of significant cluster, plus an observed value of $I = 0$ may reflect a cancelling of positive and negative levels of spatial correlation. It is therefore more meaningful and informative to also consider the Local Moran's I measure, effectively a decomposition of the Global Moran's I. The Local Moran's I is defined mathematically as:

[1] These are methods for assessing spatial autocorrelation in a variate. Details regarding the methods can be found in Anselin (1995, "Local indicators of spatial association—LISA". Geographical Analysis, 27(2), 93-115), among others. The methods can be implemented using a preferred programming language, or are accessible through developed packages in R and Python as well as select software such as ArcGIS and GeoData. The analysis relied on GeoData for spatial autocorrelation analysis, along with ArcGIS for shapefile manipulation and cleaning, including attribute cleaning and removal of blocks, as well as mapping.

$$I_i = n(y_i - \bar{y}) \sum_{j \neq i} w_{ij}(y_j - \bar{y})$$

There are also other local measures of spatial autocorrelation that have been evaluated in this analysis, such as the Local Geary's c, but is not described or reported because of similarity in findings.

An appealing aspect of the Local Moran's I is the ability to interpret the so called scatter plot, where the following relationships are evident for each Census block:

- "High-High" – A high block attribute value surrounded by high attribute values (neighboring blocks)
- "High-Low" – A high block attribute value surrounded by low attribute values (neighboring blocks)
- "Low-High" – A low block attribute value surrounded by high attribute values (neighboring blocks)
- "Low-Low" – A high block attribute value surrounded by high attribute values (neighboring blocks)

High-High represents positive spatial autocorrelation, or clustering of like attribute values. Low-Low also represents positive spatial autocorrelation, or clustering of like attribute values. In contrast, High-Low as well as Low-High represent instance of negative spatial autocorrelation.

A final spatial analytic method used in this analysis was a summary measure for a geographic distribution, namely the weighted mean center (also known as the centroid). The weighted mean center $(\bar{X}, \bar{Y})$ is defined as:

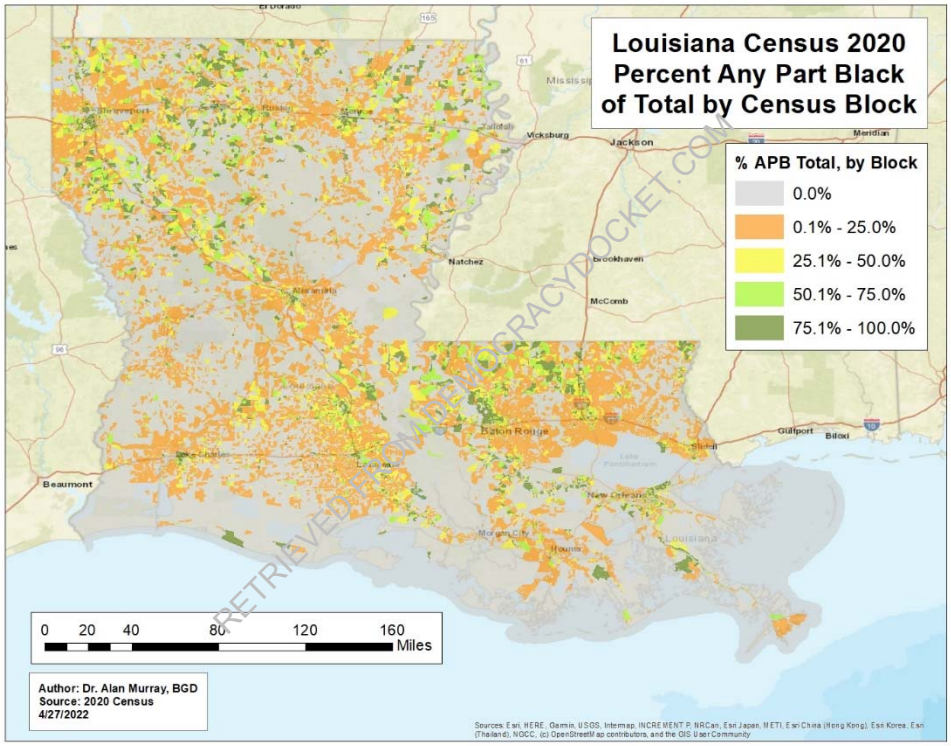
$$(\bar{X}, \bar{Y}) = \left(\frac{\sum_{i=1}^{n} y_i \phi_i}{\sum_{i=1}^{n} y_i}, \frac{\sum_{i=1}^{n} y_i \lambda_i}{\sum_{i=1}^{n} y_i} \right)$$

where (ϕ_i, λ_i) are the center coordinates of the block i and y_i is the attribute, as defined above. This is a point based summary, and can be used to evaluate two different attribute distributions. In this case, one can examine white voting age population and Black voting age population to assess whether their central tendencies are the same.

B. Statewide Analysis

I begin my analysis with an examination of the statewide distribution of the white, non-Hispanic (WNH) and the Any Part Black (APB) total and Voting Age population (VAP)[2]. The maps in Figure III.A.2 and Figure III.A.3 show the spatial distribution of the APB population around Louisiana – and that they are identical for all intents and purposes. Similarly, Figure III.A.4 and Figure III.A.5 show the spatial distribution of the WNH population around Louisiana. Again – the spatial distributions are nearly identical. As I will show – the conclusions based on the total population by race are definitive and generalizable. This statewide introduction is followed by a statewide spatial autocorrelation analysis.

Figure III.A.2 Spatial Distribution of Any Part Black Total Population



[2] This definition counts a minority by race alone or in combination with other races – no matter how many other races are mentioned. If someone responds to the census by self-identifying as Black, white, Asian, Native Hawaiian Pacific Islander, American Indian Alaskan Native and "some other" – then by the "Any Part Black" definition they are counted as Black even though it was only one of six races reported. For the purposes of the Louisiana analysis - we use this definition to refer to Any Part Black (or "APB"). I am aware that there is a dispute in this case about whether to use "DOJ Black" or Black-Alone Non-Hispanic, but for the purposes of my analysis I used the broader category to make my assessment.

Figure III.A.3 Spatial Distribution of Any Part Black Voting Age Population

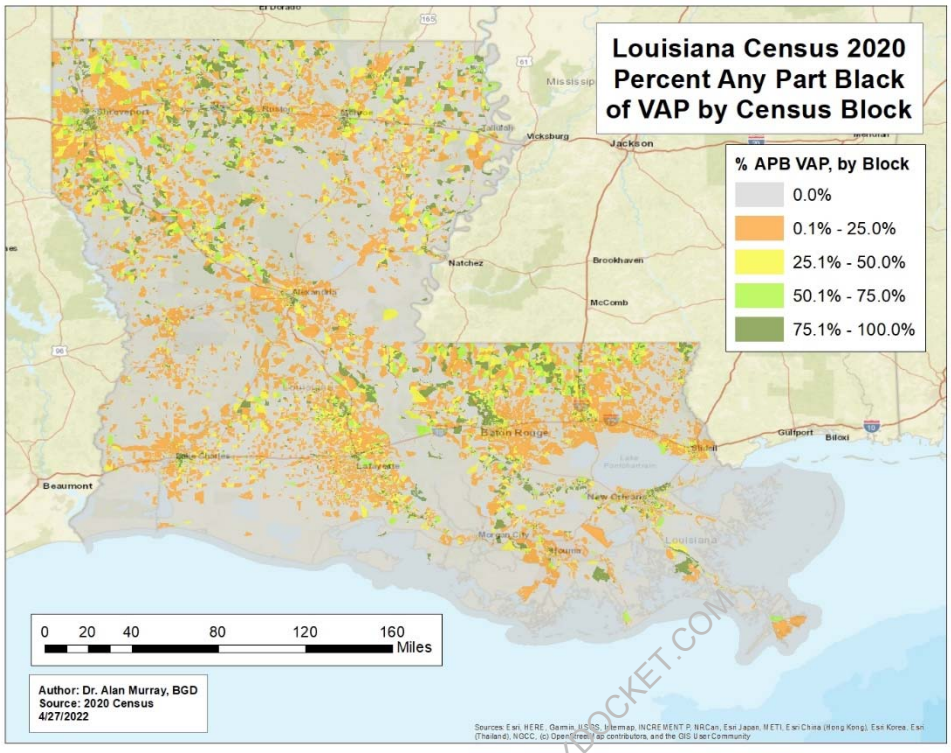


Figure III.A.4 Spatial Distribution of White, Non-Hispanic Total Population

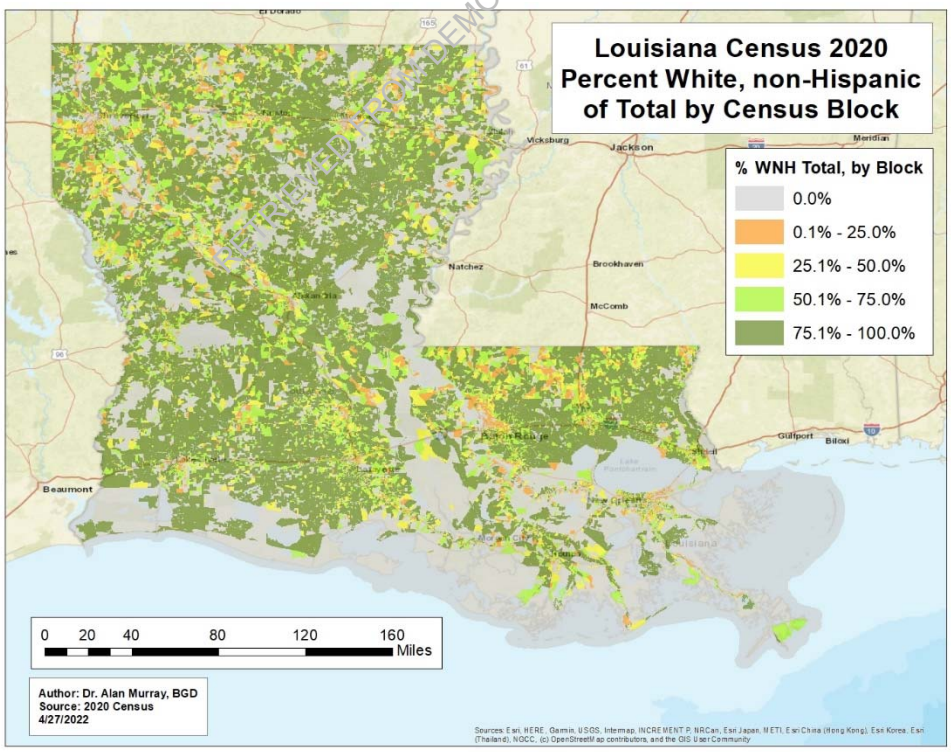
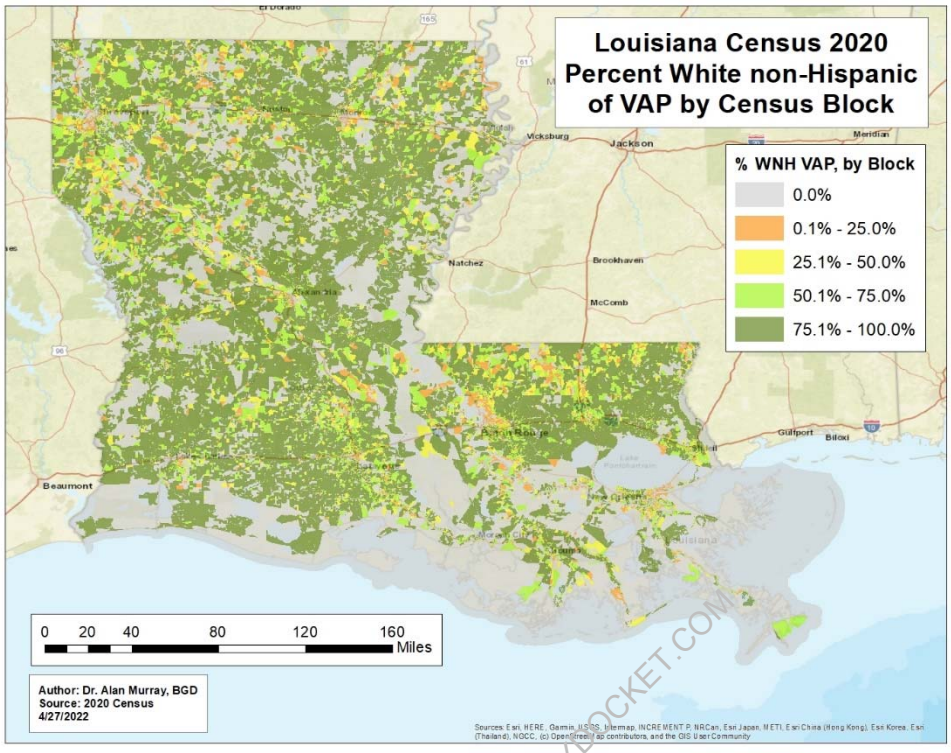


Figure III.A.5 Spatial Distribution of White, Non-Hispanic Voting Age Population



The analysis that follows assumes a spatial neighbor of a block shares a common point or edge, the so called Queen criterion. The analysis considered 92,180 blocks in the state with non-zero population values. The global Moran's I for white, non-Hispanic is 0.283, with the block population mean=22.58 and standard deviation=48.26. This is a moderate, but significant, level of positive spatial autocorrelation. Further investigation using the Local Moran's I scatter plot is shown in Figure III.A.6, indicating the 25,144 blocks with significant positive spatial autocorrelation (8,369 High-High plus 16,775 Low-Low). This offers a geographic explanation of the positive spatial autocorrelation suggest by the global value of 0.238. Figure III.A.7 shows the significance level for each indicated instance. All are significant, but with 6,618 blocks are significant at the p=0.001 level.

Figure III.A.6 White, non-Hispanic Population Spatial Autocorrelation

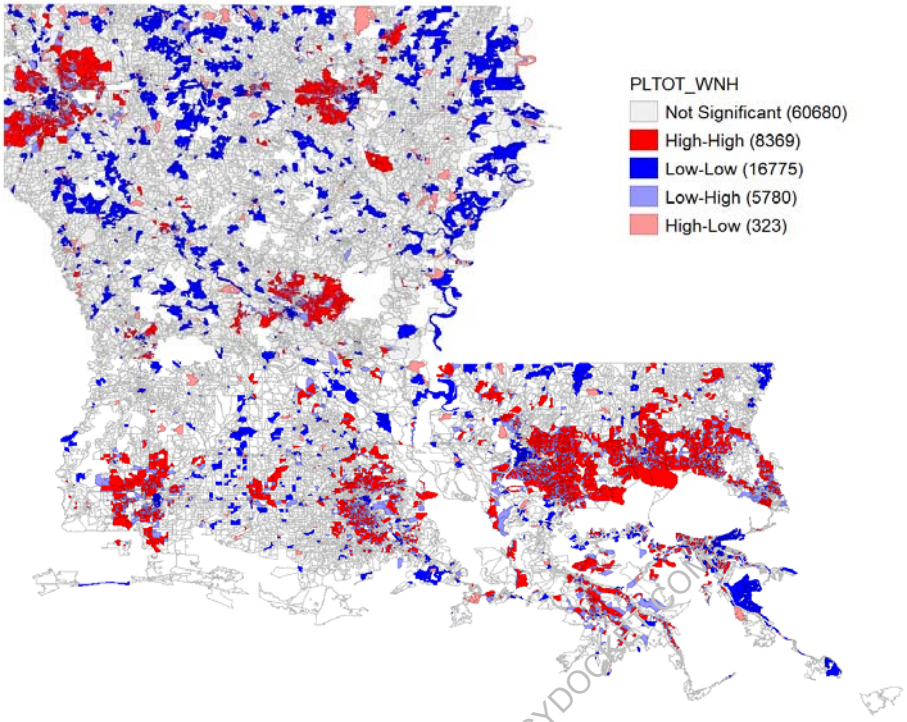
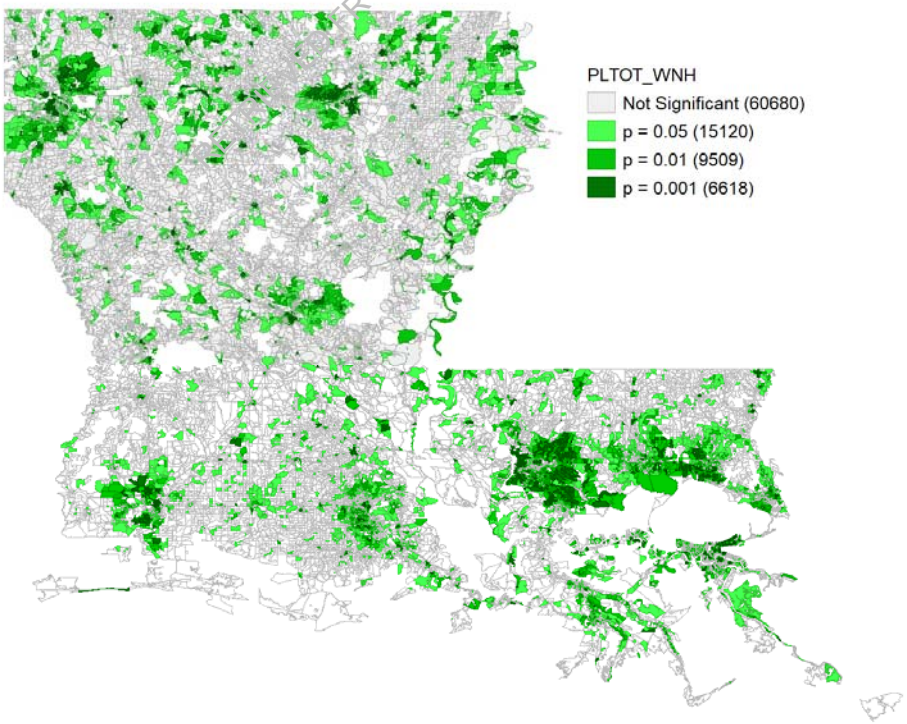


Figure III.A.7 White, non-Hispanic Population Spatial Autocorrelation Significance



The global Moran's I for Black, non-Hispanic is = 0.342, with the block population mean=11.57 and standard deviation=31.19. This is again a moderate, but significant, level of positive spatial autocorrelation. Further investigation using the Local Moran's I scatter plot is shown in Figure III.A.6, indicating the 26,759 blocks with significant positive spatial autocorrelation (7,908 High-High plus 18,851 Low-Low). This offers a geographic explanation of the positive spatial autocorrelation suggest by the global value of 0.342. Figure III.A.7 shows the significance level for each indicated instance. All are significant, but with 2,770 blocks are significant at the p=0.001 level.

Figure III.A.8 Black, non-Hispanic Population Spatial Autocorrelation

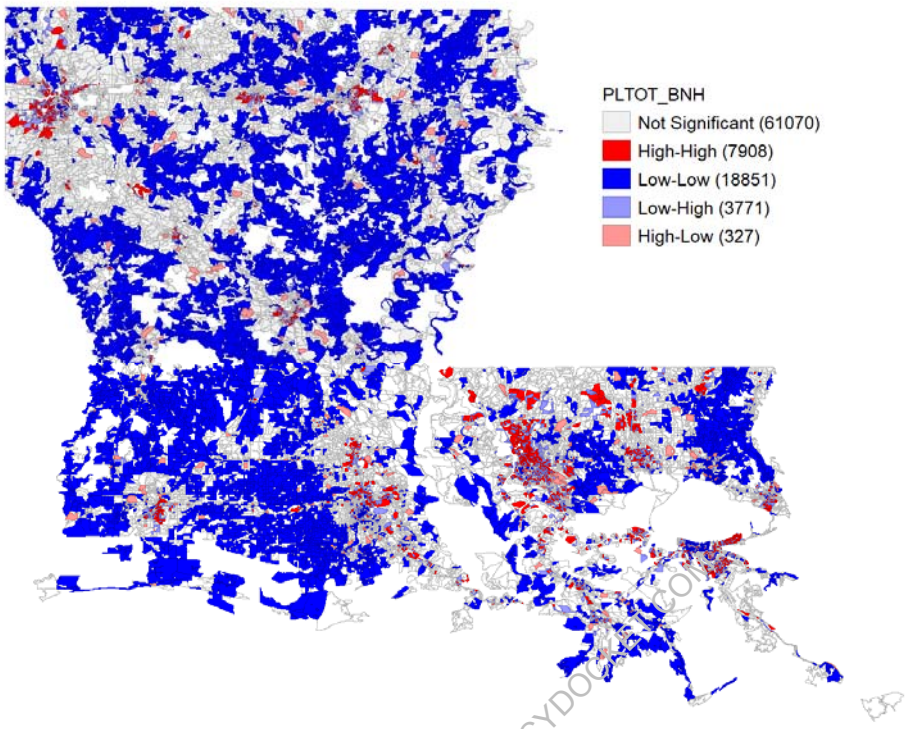
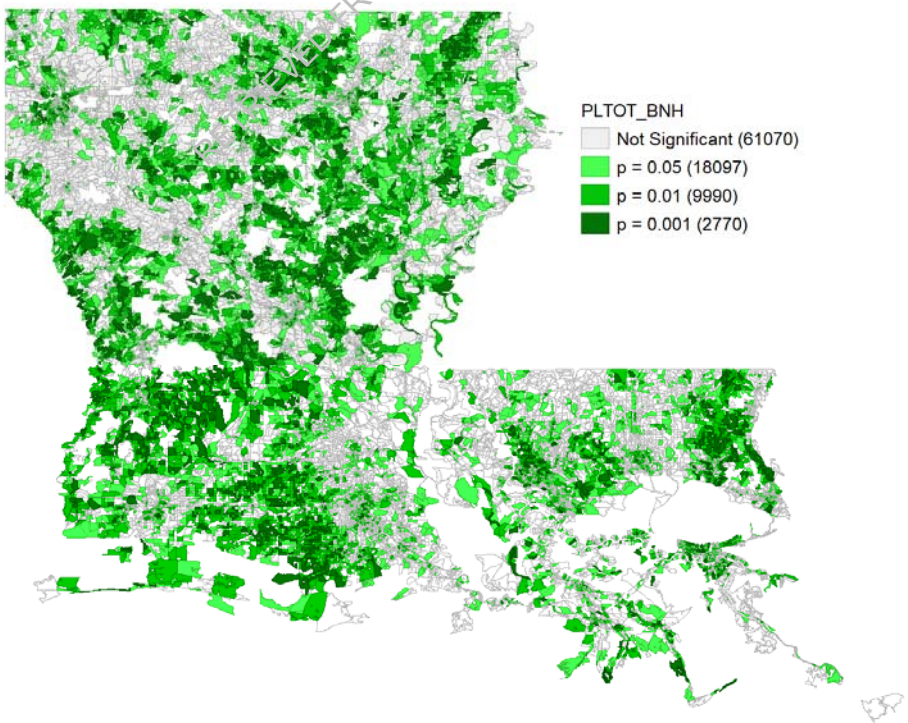


Figure III.A.9 Black, non-Hispanic Population Spatial Autocorrelation Significance



The above analysis is repeated for voting age population using standardized block population percentages, with the observed attribute count in a block divided by the total voting age population of the block. In percentage terms, the attribute of each block now ranges from [0, +1], where 0 indicates no Voting Age Population white, non-Hispanic and 1 represents 100% Voting Age Population white, non-Hispanic, as an example. The global Moran's I for Percent Voting Age Population white, non-Hispanic is 0.565, with the block population mean= 0.55 and standard deviation=0.37. This is a high, and significant, level of positive spatial autocorrelation. Further investigation using the Local Moran's I scatter plot is shown in Figure III.A.10, indicating the 37,496 blocks with significant positive spatial autocorrelation. This offers a geographic explanation of the positive spatial autocorrelation suggest by the global value of 0.565. Figure III.A.11 shows the significance level for each indicated instance. All are significant, but with 9,832 blocks are significant at the p=0.001 level.

Figure III.A.10 Percent White, non-Hispanic Population Spatial Autocorrelation

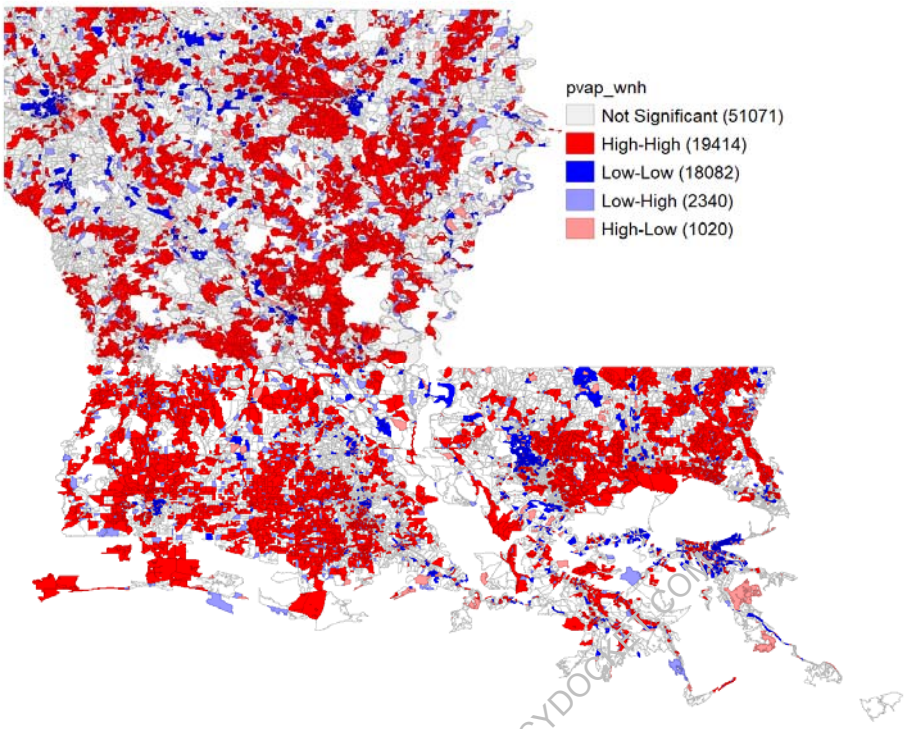
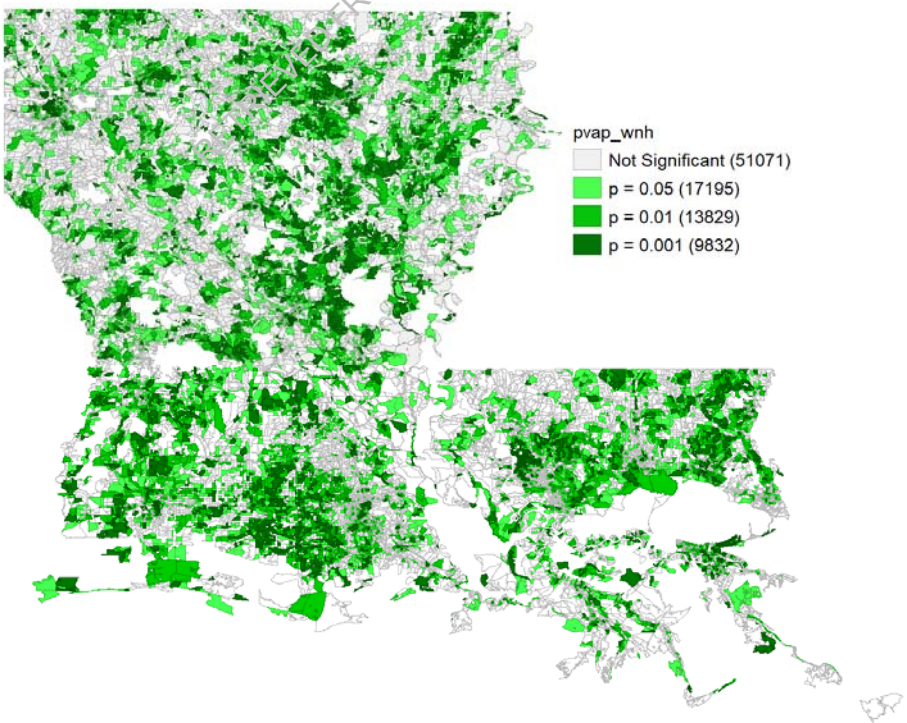


Figure III.A.11 Percent White, non-Hispanic Population Spatial Autocorrelation Significance



Focusing now on the Voting Age Population Black, non-Hispanic, again in percentage terms the attribute of each block now ranges from [0, +1], where 0 indicates no Voting Age Population Black, non-Hispanic and 1 represents 100% Voting Age Population Black, non-Hispanic. The global Moran's I for Percent Voting Age Population Black, non-Hispanic is 0.675, with the block population mean= 0.29 and standard deviation=0.35. This is a high, and significant, level of positive spatial autocorrelation. Further investigation using the Local Moran's I scatter plot is shown in Figure III.A.12, indicating the 37,563 blocks with significant positive spatial autocorrelation. This offers a geographic explanation of the positive spatial autocorrelation suggest by the global value of 0.675. Figure III.A.13 shows the significance level for each indicated instance. All are significant, but with 10,439 blocks are significant at the p=0.001 level.

Figure III.A.12 Percent Black, non-Hispanic Population Spatial Autocorrelation

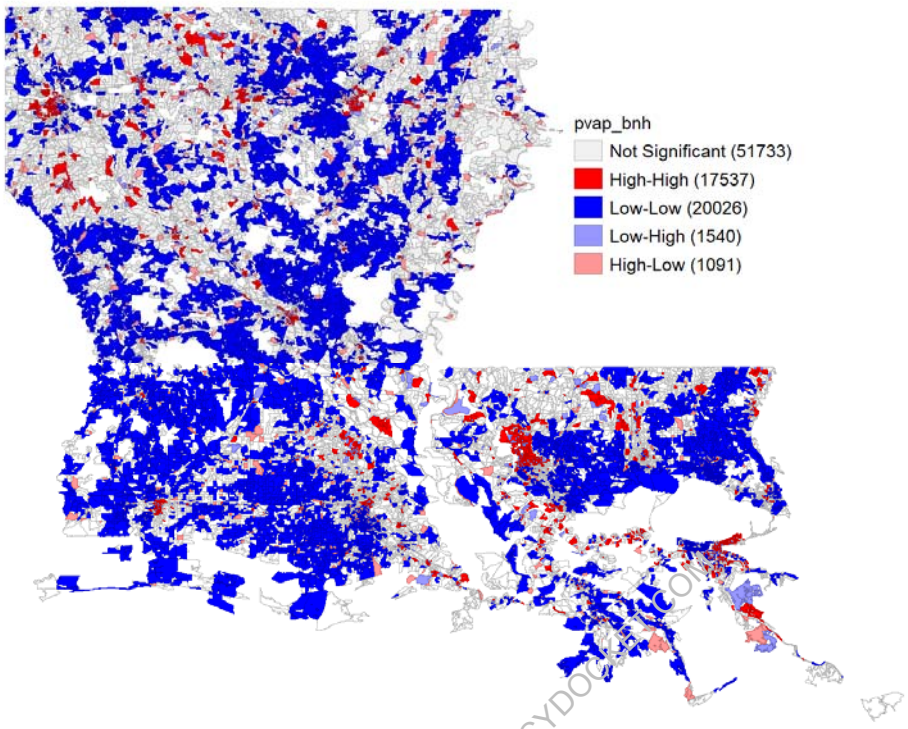
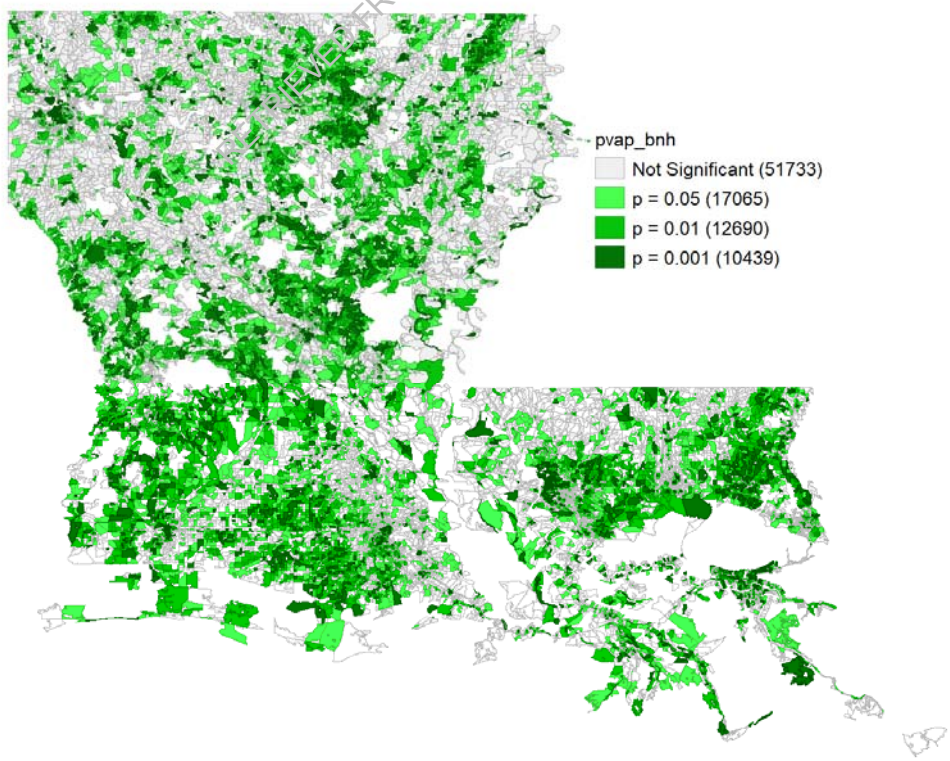


Figure III.A.13 Percent Black, non-Hispanic Population Spatial Autocorrelation Significance



While the above analysis of population counts and percentages of white and Black voting age populations is insightful, they are carried out independently in some sense, and not directly compared. In order to provide a more direct comparison, an analysis of Percent white Voting Age Population minus Percent Black Voting Age Population (e.g., %WVAP - %BVAP) is provided. This attribute ranges from [-1, +1], where -1 indicates a block is 100% Black VAP and +1 indicates a block is 100% white VAP. The analysis finds that there is statistically significant heterogeneity in the spatial distribution of white and Black VAP. That is, as suggested previously, a clusters of high percent white blocks (and low percent blocks) as well as a clusters of high percent Black blocks (and low percent blocks). In practical terms, the geographic distributions of white VAP is not the same as Black VAP, and they do not co-vary across space. A regional level, the observed Global Moran's I of 0.677 is exceptionally high (and significant). The local Moran's analysis in in Figure III.A.14 identifies specific instances of clustering. This suggests a high level of positive spatial autocorrelation, with blocks of high percentages of white VAP surrounded by high percentages of white VAP as well as blocks of low percentages of white VAP surrounded by low percentages of white VAP. Additionally, there are blocks of high percentages of Black VAP surrounded by high percentages of Black VAP as well as blocks of low percentages of Black VAP surrounded by low percentages of Black VAP. Essentially the entire state has noteworthy local areas of statistically significant clusters. Local Moran's I identifies 21,623 blocks with High-High and 18,493 blocks with Low-Low, both reflective of positive spatial autocorrelation.

Figure III.A.14 Difference in Percent White and Black (non-Hispanic) Population Spatial Autocorrelation

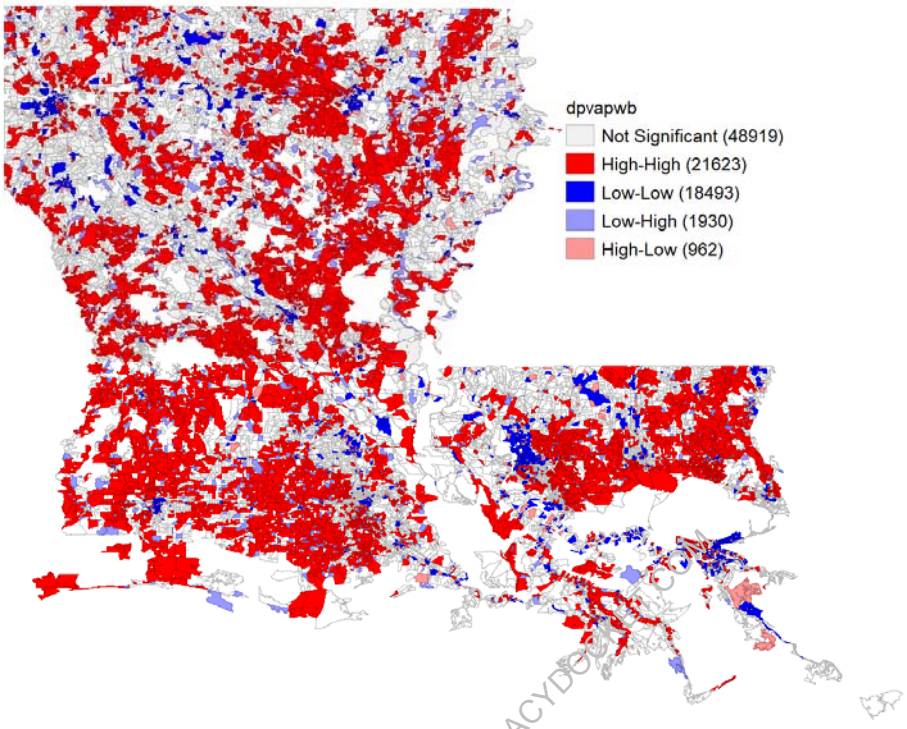
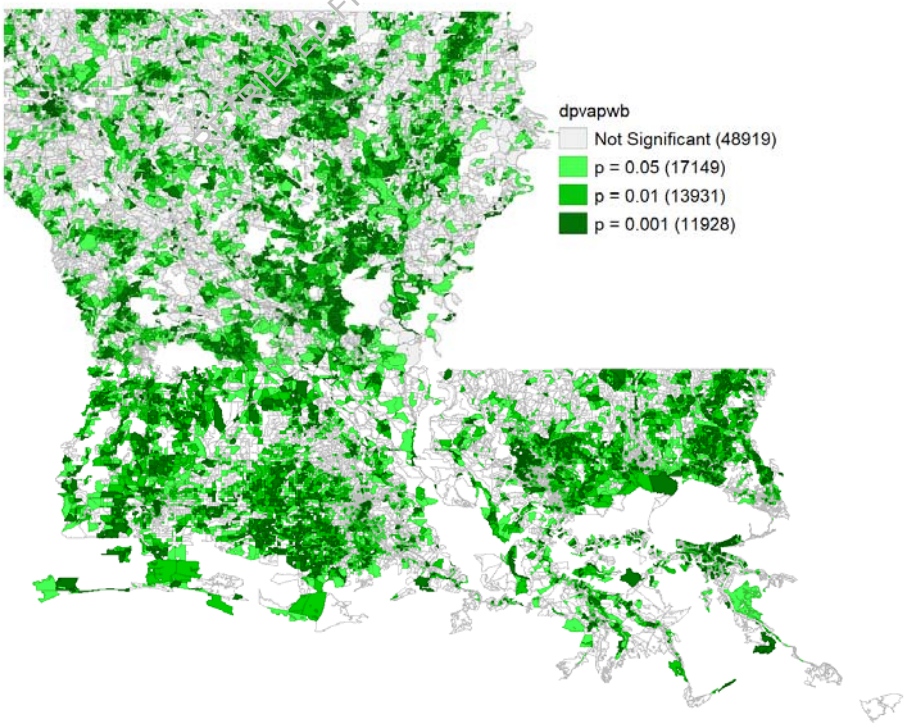


Figure III.A.15 Difference in Percent White and Black (non-Hispanic) Population Spatial Autocorrelation Significance



C. Sub-State Analysis

The analysis at the state level makes it difficult to see local variability with in major cities. Figure III.A.16 shows the local Moran's I findings for New Orleans and Figure III.A.17 shows the local Moran's I findings for Baton Rouge. The neighborhood clusters are clear and prominent.

Figure III.A.16 Difference in Percent White and Black (non-Hispanic) Population Spatial Autocorrelation – New Orleans

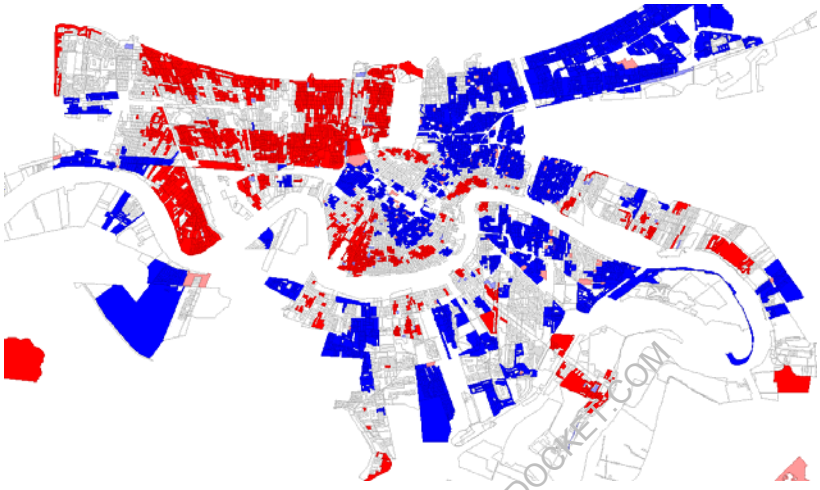
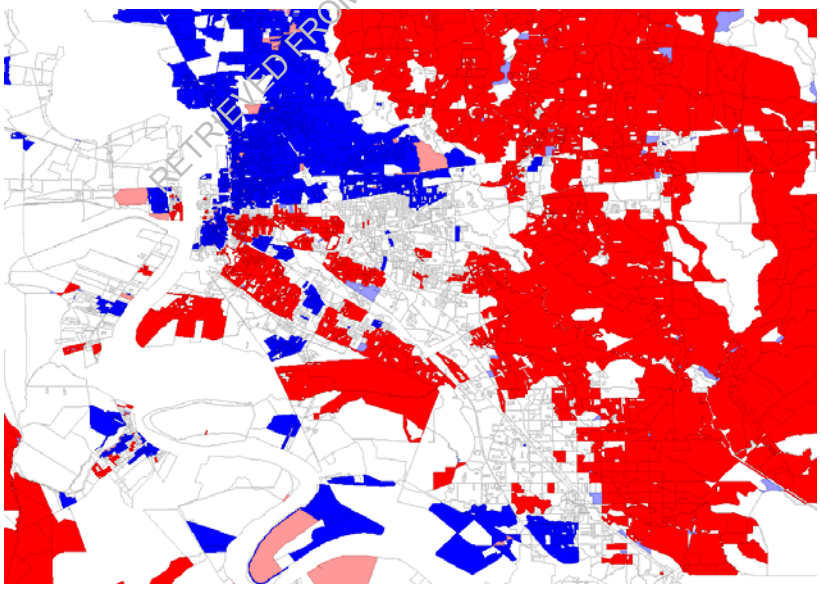


Figure III.A.17 Difference in Percent White and Black (non-Hispanic) Population Spatial Autocorrelation – Baton Rouge



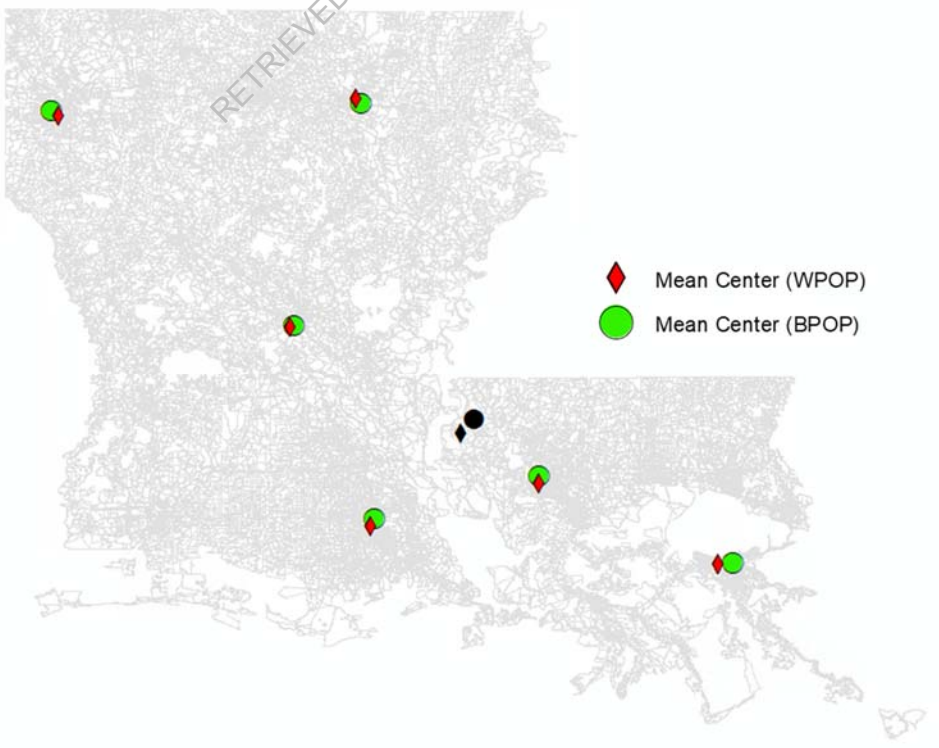
Another way in which the distributions of white and Black voting age population may be are clearly different is through the examination of spatial centrality**.** Figure III.A.18 indicates the white and Black weighted mean center for the state, and the cities of Alexandria, Baton Rouge,

New Orleans, Lafayette, Monroe and Shreveport. There are significant distances between center locations:

	Distance Between BPOP & WPOP Mean Centers (miles)
Alexandria	1.48
Baton Rouge	3.10
New Orleans	4.78
Lafayette	2.80
Monroe	2.64
Shreveport	2.72
Region	6.51

These differences are significant, ranges in 1.48 miles to 4.78 miles. Across the region, the difference is even larger, 6.51 miles. This further supports that the geographic distributions of white and Black population within cities and across the state differs in important and nuanced ways as demonstrated across the analysis provided.

Figure III.A.18 Geographic centrality for White and Black Populations, across the state and for select cities (Alexandria, Baton Rouge, New Orleans, Lafayette, Monroe and Shreveport)



Finally, distances between the selected cities is noted, and highlights how these concentrations of black populations are not clustered close together.

	Alexandria	Baton Rouge	New Orleans	Lafayette	Monroe	Shreveport
Alexandria	0	98	169	77	86	112
Baton Rouge	98	0	72	56	152	209
New Orleans	169	72	0	119	211	279
Lafayette	77	56	119	0	157	186
Monroe	86	152	211	157	0	99
Shreveport	112	209	279	186	99	0

IV. CONCLUSION

The analysis finds that white and Black Voting Age Populations are not at all similarly geospatially distributed, with significant clusters of concentrated groupings. Essentially the entire state has noteworthy local areas of statistically significant clusters. This is evident in the supporting maps summaries, where positive spatial autocorrelation is identified. Namely there are clusters of high percent white populations as well as clusters of high percent Black populations. Not only are rural areas in the state dominated by high percentages of white population, but urban areas have clusters of high percent white population as well. Prominent Black population cluster can be observed as well, particularly in urban areas, although these urban areas are separated from each other. The weighted mean center analysis was offered as a summary to further highlight the differences in the spatial distribution of white and Black populations in the state and select cities. This further supports that the geographic distributions of white and Black population within cities and across the state differs in important and nuanced ways as demonstrated across the analysis provided.

Submitted: April 29, 2022

Dr. Alan Murray

Appendix 1 Dr. Alan Murray CV

Curriculum Vitae

Alan T. Murray

Contact Details

Department of Geography
University of California at Santa Barbara
Santa Barbara, CA 93106, USA
Phone: 1-805-893-3663
Email: amurray@ucsb.edu

Education

Ph.D. 1995, University of California at Santa Barbara (Geography), USA

M.A. 1992, University of California at Santa Barbara (Statistics and Applied Probability), USA

B.S. 1990, University of California at Santa Barbara (Mathematics), USA

Administrative Appointments

2021-2022	UCSB-SDSU Joint Doctoral Program Graduate Advisor, Department of Geography, University of California at Santa Barbara
2017-2021	Graduate Advisor, Department of Geography, University of California at Santa Barbara
2017-2021	Vice Chair, Department of Geography, University of California at Santa Barbara
2014-2015	Director, Center for Spatial Analytics and Geocomputation, Drexel University
2005-2008	Director, Center for Urban and Regional Analysis, The Ohio State University

Academic Appointments

2015-present	Professor, Department of Geography, University of California at Santa Barbara
2014-2015	Professor, College of Computing and Informatics / School of Public Health, Drexel University
2008-2014	Professor, School of Geographical Sciences and Urban Planning, Arizona State University
2005-2008	Professor, Department of Geography, The Ohio State University
2002-2005	Associate Professor, Department of Geography, The Ohio State University
1999-2002	Assistant Professor, Department of Geography, The Ohio State University

1997-1999	Research Fellow and Lecturer, Australian Housing and Urban Research Institute, Department of Geographical Sciences and Planning, University of Queensland
1996-1997	Postdoctoral Research Fellow, Australian Housing and Urban Research Institute, Faculty of Built Environment and Engineering, Queensland University of Technology
1991-1995	Research Associate and Teaching Assistant, Department of Geography, University of California at Santa Barbara

Affiliations

2017-present	Affiliate, Earth Research Institute, University of California at Santa Barbara
2016-present	Research Associate, Broom Center for Demography, University of California at Santa Barbara
2015-present	Adjunct Professor, Department of Geography, San Diego State University
2015-2016	Adjunct Professor, School of Geographical Sciences and Urban Planning, Arizona State University
2010-2014	Industrial Engineering Graduate Faculty, School of Computing, Informatics, and Decision Systems Engineering, Arizona State University
2010-2014	Senior Sustainability Scientist, School of Sustainability, Arizona State University
2012-2014	Affiliated Research Professor, Regional Economics and Spatial Modeling Laboratory, University of Arizona
2008-2010	Guest Professor, Laboratory for Earth and Space Information Technologies, Shenzhen Institute for Advanced Technology, The Chinese Academy of Sciences, China

Editorial Appointments

2022-present	Editorial Board, *Urban Informatics*
2018-present	Editorial Board, *International Journal of Geographical Information Science*
2017-2025	Editorial Board, *Transactions in GIS*
2016-present	Associate Editor, *Papers in Regional Science*
2015-present	Editorial Board, *Computers, Environment and Urban Systems*
2014-present	Editorial Board, *Geographical Analysis*
2014-2018	Editorial Board, *Annals of the Association of American Geographers*
2010-present	Associate Editor, *Socio-Economic Planning Sciences*
2009-present	Co-Editor, *International Regional Science Review*
2009-2010	Executive Editorial Board, *International Journal of Mathematical and Computational Forestry & Natural-Resource Science*

2002-2008 Editor, *Geographical Analysis*

2001-2004 Associate Editor, *Forest Science*

2001-2002 Associate Editor, *Geographical Analysis*

Themed Issues

2020 Guest Editor, *Geographical Analysis*, volume 51 – Tribute to Professor Waldo Tobler (with K. Clarke)

2016 Guest Editor, *International Regional Science Review*, volume 39 – 40 Years of Maximal Coverage (with R. Church)

2014 Guest Editor, *International Regional Science Review*, volume 37 – Location Analysis and Modeling: ISOLDE XI (with A. Suzuki)

2012 Guest Editor, *Socio-Economic Planning Sciences*, volume 46 – Modeling Public Sector Facility Location Problems (with M. Daskin)

2011 Guest Editor, *International Regional Science Review*, volume 34 – Location Analysis and Modeling: ISOLDE X (with R. Church)

2009 Guest Editor, *Socio-Economic Planning Sciences*, volume 43 – The Contributions of Charles S. ReVelle (with T. Matisziw and J. Osleeb)

2001 Guest Editor, *Journal of Geographical Systems*, volume 3 – Spatial Modeling and GIScience

2001 Guest Editor, *Studies in Regional and Urban Planning*, volume 9

2000 Guest Editor, *Forest Science*, volume 46 – Modeling in Natural Resource Management and Planning (with S. Snyder)

Honors and Awards

2022 Best Paper Award (Location Intelligence) - Murray, A.T, R.L. Church, B.A. Pludow and P. Stine. "Location analytics for transitioning to fire resilient landscapes." 2022 Proceedings of the 55th Hawaii International Conference on System Sciences (http://hdl.handle.net/10125/80037).

2019 Elected Fellow, American Association for the Advancement of Science.

2019 William Alonso Memorial Prize for Innovative Work in Regional Science (Awarded by North American Regional Science Council) - Church, R.L. and A. Murray (2018), *Location Covering Models: History, Applications, and Advancements* (Berlin: Springer).

2019 Education Excellence Award, International Association of Chinese Professionals in Geographic Information Sciences.

2018 Elected Fellow, Regional Science Association International.

2017 Distinguished Scholar Award, Regional Development and Planning Specialty Group, American Association of Geographers.

2015 Walter Isard Award for Scholarly Achievement, North American Regional Science Council.

2014 Outstanding Service Award, Spatial Analysis and Modeling Specialty Group, American Association of Geographers.

2007 Best Publication Award in Forestry (Awarded by Energy, Natural Resources, and the Environment section of Institute for Operations Research and the Management Science [INFORMS]) - Goycoolea, M., A.T. Murray, F. Barahona, R. Epstein and A. Weintraub (2005), "Harvest scheduling subject to maximum area restrictions: exploring exact approaches", *Operations Research* **53**, 490-500.

2004 Geoffrey J.D. Hewings Award for Outstanding Young Scholar, North American Regional Science Council.

Teaching and Research Interests

Geographic information science; health disparities; crime and violence; urban, regional, and natural resource planning and development; public policy; infrastructure and transportation systems; spatial optimization; location modeling; spatial representation; spatial statistics; and, techniques to support interactive planning and decision making.

Publications

D. Books and Edited Volumes (3 total)

2018 R.L. Church and A.T. Murray. *Location Covering Models: History, Applications, and Advancements* (Berlin: Springer).

2009 R.L. Church and A.T. Murray. *Business Site Selection, Location Analysis and GIS* (New York: Wiley).

2007 A.T. Murray and T.H. Grubesic (editors). *Critical Infrastructure: Reliability and Vulnerability* (Berlin: Springer).

E. Refereed Articles, Book Chapters and Proceedings (287 total)

2022 A.T. Murray. "Sources of uncertainty in location analysis." In *Uncertainty in Facility Location Models: Incorporating Location Science and Randomness,* edited by H.A. Eiselt and V. Marianov (Springer).

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2000 Papers in Regional Science, vol. 79, 103-104 – *The Economics of Industrial Location* by P. McCann, 1998 (Berlin: Springer-Verlag).

***Publications in Progress* (6 total)**

J. Baik and A.T. Murray. "Locating a facility to simultaneously address access and coverage goals". Revised for *Papers in Regional Science* (revised 2/26/22; submitted 8/19/21).

A.T. Murray and J. Baik. "Spatial optimization in strategic siting of urban infrastructure and services." Submitted to *Journal of Urban Informatics* (submitted 9/24/21).

J. Xu, A.T. Murray, R.L. Church and R. Wei. "Service allocation equity in maximal covering." Revised for *European Journal of Operational Research* (revised 3/5/22; submitted 9/26/21).

S. Cho, A.T. Murray, S. Dodge and J. Baik. "Location-allocation to address access and coverage: a heuristic for identifying non-dominated solutions." Revised for *International Journal of Geographical Information Science* (revised ??; submitted 2/10/22).

A.T. Murray, R.L. Church and B.A. Pludow. "Multiple patch land allocation." Revised for *Computers, Environment and Urban Systems* (revised ??; submitted 2/12/22).

A.T. Murray, K. Shammout, R. Farwell, K. Burrows and T. Cox. "Strategic planning to support on-demand mobility needs." Submitted to *Journal of Transport Geography* (submitted 4/15/22).

Courses Taught

- GEOG 172 (UCSB) – Intermediate Geographical Data Analysis (2016, 2017, 2018, 2019)
- GEOG 185D (UCSB) – Urban and Environmental Systems Analysis (2023)
- GEOG 190/290 (UCSB) – Location Theory and Modeling (2017, 2019, 2021)
- GEOG 191/291 (UCSB) – Introduction to Optimization Methods for Geographic Problems (2021, 2021)
- GEOG 200A (UCSB) – Introduction to Geographic Research (2017, 2018, 2019, 2020)
- GEOG 210B (UCSB) – Analytical Methods in Geography II (2017)
- GEOG 294 (UCSB) – Advanced Topics in Location and Transportation Systems (2016, 2018, 2020, 2022)
- INFO 220 (Drexel) – Geographic Information Science (2014, 2015)
- GPH 473/591 (ASU) – Geographic Information Science II (2009, 2010, 2011, 2012, 2014)
- GPH/PUP 481/581 (ASU) – Optimization Fundamentals for Spatial Analysis (2009, 2010, 2011, 2012, 2013) (GCU 494/598 prior to 2012)
- GPH/PUP 482/582 (ASU) – Location Analysis and Modeling (2009, 2010, 2012, 2014) (GCU 494/598 prior to 2012)

- GPH/PUP 598 (ASU) – Advanced Topics in Location Modeling: Shortest paths, obstacles and uncertainty (2013)
- GCU/GPH 591 (ASU) – Geography Forum (Professional Development) (2010, 2011)
- GCU/GPH 591 (ASU) – Geography Colloquium (2009, 2010, 2011, 2012, 2013)
- PUP 701 (ASU) – Urban Planning Colloquium (2012, 2013)
- GCU 598/PUP 591 (ASU) – Special Topics: Location Analysis and Modeling (2010)
- Geog 200 (OSU) – World Regional Geography (2000 Winter and Autumn, 2001)
- Geog 607 (OSU) – Fundamentals of Geographic Information System (Team taught: 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007)
- Geog 647 (OSU) – Locational Analysis (2005, 2006, 2007, 2008)
- Geog 683 (OSU) – Introduction to Geographic Analysis (2002, 2003, 2004, 2005)
- Geog 685 (OSU) – Intermediate Geographical Information Systems (2000, 2001, 2002, 2003, 2004)
- Geog 740 (OSU) – Locational Analysis (2006, 2008)
- Geog 840.01 (OSU) – Seminar in Location Theory: Spatial representation issues (2006)
- Geog 840.01 (OSU) – Seminar in Location Theory: GIS and modeling (2007)
- Geog 840.02 (OSU) – Seminar in Locational Analysis (1999)
- Geog 840.02 (OSU) – Seminar in Locational Analysis: Natural resource management (2002)
- Geog 845.01 (OSU) – Seminar in Transportation Geography: Public transit (2001)
- Geog 889 (OSU) – Seminar in Geography: Professional development in geography (Co-taught: 2003, 2004, 2005)
- Geog 983 (OSU) – Special Topics in Quantitative Geography: Lagrangian relaxation (2000)
- Geog 983 (OSU) – Special Topics in Quantitative Geography: Voronoi diagrams and spatial optimization (2003)
- Geog 983 (OSU) – Special Topics in Quantitative Geography: Network analysis (2004)
- GN 342 (UQ) – Spatial Analysis and Geographical Information Systems (1998)
- GN 882 (UQ) – Natural Resources Information Systems (Co-taught 1998)
- ITN 357 (QUT) – Special Topic in Information Studies: GIS and Spatial Analysis (1997)

Students Advised

Postdoctoral (advisor) (2 total)

- Timothy Matisziw – Ohio State University (2005-2008) (Associate Professor, University of Missouri)

- Tony Grubesic – Ohio State University (2001-2002) (Professor and Associate Dean, University of Texas / Professor, Arizona State University / Professor, Drexel University / Associate Professor, Oregon State University / Associate Professor, Indiana University / Assistant Professor, University of Cincinnati)

Doctoral (advisor) (24 total)

- Vanessa Figueroa – University of California at Santa Barbara
- Jiwon Baik – University of California at Santa Barbara
- Seonga Cho (co-advisor) – University of California at Santa Barbara
- Evgeny Noi (co-advisor) – University of California at Santa Barbara
- Enbo Zhou (co-advisor) – University of California at Santa Barbara
- B. Amelia Pludow – University of California at Santa Barbara, ABD 2020 ("Demography of wildfire risk in the wildland-urban interface"). **Awards:** 2021-22 UCSB Graduate Research Mentorship Fellowship.
- Susan Burtner – University of California at Santa Barbara, ABD 2020 ("Artificial intelligence and network approaches for migration analysis")
- Jing Xu – University of California at Santa Barbara, 2021 "Addressing facility workload balancing in coverage problems" (Data Scientist, Meta)
- Xin Feng – University of California at Santa Barbara, 2019, "Heterogeneity impacts and implications in allocation and location processes." **Awards:** 2018-19 Excellence in Research Award (Geography, UCSB) (Assistant Professor, University of Oklahoma / Postdoctoral scholar, UC Riverside)
- Insu Hong – Arizona State University, 2015, "Deriving an obstacle-avoiding shortest path in continuous space: a spatial analytic approach." (Assistant Professor, West Virginia University; Currently: Senior Consultant, CJ Logistics)
- Ran Wei – Arizona State University, 2013, "Addressing geographic uncertainty in spatial optimization." **Awards**: 2011 UCGIS Summer Assembly Transactions in GIS Best Paper Award, 2011-12 ASU Graduate Research Support Program Award, 2012 ASU Graduate College Completion Fellowship, 2012-13 Regional Science Association International Benjamin H. Stevens Graduate Fellowship, 2021 INFORMS Section on Location Analysis Chuck ReVelle Rising Star Award (Associate Professor, University of California at Riverside / Assistant Professor, University of Utah)
- Jing Yao – Arizona State University, 2012, "Spatial optimization approaches for solving the continuous Weber and multi-Weber problems." **Awards**: 2012 Chinese Government Award for Outstanding Self-financed Students Abroad; 2013-15 Young Scientists Fund grant (National Natural Science Foundation of China) (Senior Lecturer, University of Glasgow)
- Yin Liu – Arizona State University, 2012, "An exploratory toolkit for exploring residential movement patterns at a micro scale" (Research Scientist, Sichuan Normal University)

- Khaled Shammout – Ohio State University, ABD Spring 2008 ("Three-step approach to designing a comprehensive bus transit network") (VP of Strategic Planning and Development, Southwest Ohio Regional Transit Authority)
- Jessica Mefford – Ohio State University, ABD Summer 2006 ("Determining activity space: An integrative spatial and behavioral approach to identifying travel decision outcomes under conditions of uncertainty") (Executive Director, Metro Transit, St. Louis, Missouri)
- Ho-Seop Cha – Ohio State University, 2008, "Enhancing equity in public transportation using geographic information systems and spatial optimization" (Assistant Professor, Park University / Assistant Professor, University of Central Missouri)
- Hu Wei – Ohio State University, 2007, "Solving continuous space location problems" (Chief Data Officer, Yingying Group)
- Daoqin Tong – Ohio State University, 2007, "Continuous space facility location for covering spatial demand objects." **Awards**: 2006 UCGIS Summer Assembly Best Paper Award, 2016 North American Regional Science Council Hewings Award (Associate Professor, Arizona State University / Assistant Professor, University of Arizona)
- Kamyoung Kim – Ohio State University, 2007, "Spatial analytical approaches for supporting security monitoring" (Associate Professor, Kyungpook National University)
- Xiaolan Wu – Ohio State University, 2005, "Quantification and optimization of spatial contiguity in land use planning" (Assistant Professor, Central Michigan University; Currently: Credit Risk Statistical Modeler, KeyBank)
- Changshan Wu – Ohio State University, 2003, "Remote sensing, geographic information systems and spatial modeling for analyzing public transit services." **Awards**: 2003 E. Willard and Ruby S. Miller Fellow (OSU), 2006 Intergraph UCGIS Young Scholar Award (Professor and Chair, University of Wisconsin at Milwaukee)
- Bilal Farhan – Ohio State University, 2003, "Evaluation, modeling and policy assessment for park and ride services as a component of public transportation" (Chief Engineer, Roads & Transport Authority, United Arab Emirates)
- Ickjai Lee (co-advisor) – University of Newcastle, 2002, "Multi-purpose boundary-based clustering on proximity graphs for geographical data mining" (Professor, James Cook University)
- Doug Ward (co-advisor) – University of Queensland, 2001, "Spatial form and dynamics of urban growth" (Senior Research Fellow, Griffith University)

Doctoral (committee member) (29 total)

- Chanwoo Jin – San Diego State University, ABD 2020
- Rafael Ramos – University of California at Santa Barbara, 2019 (Postdoctoral Research Associate, INPE, Brazil)
- Yujia Zhang – Arizona State University, 2018 (Postdoctoral scholar, Phoenix LTER, Arizona State University)
- Jorge Chen – University of California at Santa Barbara, 2017 (Research Scientist, Oak Ridge Institute for Science and Education)

- Sarah Blakeley – University of California at Santa Barbara (examination committee Fall 2016) (Postdoctoral scholar, Climate Hazards Center, University of California at Santa Barbara)
- Fangwu Wei – Drexel University, 2016 (examination committee Spring 2015) (Assistant Research Scientist, Arizona State University)
- Robert Oxley – Arizona State University (Sustainable Engineering and the Built Environment), 2015
- Ning Wang – Arizona State University (Industrial Engineering), 2013 (Lead data scientist, KMPG)
- Nicholas Malizia – Arizona State University, 2013 (Director of Data Science, GeoInnovation at Indigo)
- Lawrence Joseph– Arizona State University, 2013 (examination committee Summer 2010) (Franchise Development, KFC)
- David Folch - Arizona State University, 2012 (Assistant Professor, Northern Arizona University / Assistant Professor, Florida State University)
- Jong-Geun Kim – Arizona State University, 2010 (Lecturer, Seoul National University)
- Gunhak Lee – Ohio State University, 2008 (Professor, Seoul National University, South Korea)
- Myung Jin Kim – Ohio State University, 2011 (examination committee Spring 2007)
- Michael Niedzielski – Ohio State University, 2009 (examination committee Spring 2007) (Institute of Geography and Spatial Organization, Polish Academy of Sciences / Associate Professor, University of North Dakota)
- Jung Hwi (David) Lee – Ohio State University (City and Regional Planning), 2010 (examination committee Spring 2006) (Assistant Director, Long Range Planning Division, Tennessee Department of Transportation)
- Hyun Kim – Ohio State University, 2008 (Associate Professor, University of Tennessee / Assistant Professor, University of South Florida)
- Sunhee Sang – Ohio State University, 2008 (examination committee Spring 2005)
- Sumei Zhang – Ohio State University (City and Regional Planning), 2008 (examination committee Spring 2004) (Associate Professor, University of Louisville)
- Wook Lee – Ohio State University, 2005 (Associate Professor, Edinboro University)
- Timothy Matisziw – Ohio State University, 2005 (Associate Professor, University of Missouri)
- Hui Xie – Ohio State University (City and Regional Planning), ABD Summer 2002 (Senior Transportation Engineer, OKI Regional COG)
- Sherrylyn Henry – Ohio State University, ABD Autumn 2001
- Hyun-Mi Kim – Ohio State University, 2005 (examination committee Winter 2002) (Lecturer, Seoul National University, South Korea)

- Changjoo Kim – Ohio State University, 2004 (Associate Professor, University of Cincinnati)
- Sudhir Thakur – Ohio State University, 2004 (Associate Professor, California State University, Sacramento)
- Mark Horner – Ohio State University, 2002 (Professor, Florida State University)
- Tony Grubesic – Ohio State University, 2001 (Professor, University of Texas / Professor, Arizona State University / Professor, Drexel University / Associate Professor, Oregon State University / Associate Professor, Indiana University / Assistant Professor, University of Cincinnati)
- Jiyeong Lee – Ohio State University, 2001 (examination committee Winter 2000) (Professor, University of Seoul, South Korea)

Doctoral (external reviewer) (5 total)

- Shivesh Karan – Indian Institute of Technology, Dhanbad, Environmental Science and Engineering, 2019
- Monika Mangla – Thapar Institute of Engineering and Technology, Computer Science and Engineering, 2018
- Mohammad Aakil Caunhye – Nanyang Technological University, School of Mechanical and Aerospace Engineering, 2013
- Mustafa Canbolat – McMaster University, School of Business, 2010
- Mohan Akella – State University of New York at Buffalo, Department of Industrial Engineering, 2005

Master's (advisor) (17 total)

- Jiwon Baik – University of California at Santa Barbara, 2021, "A bi-objective facility location problem: coverage and access"
- B. Amelia Pludow – University of California at Santa Barbara, 2019, "Evaluating service system coverage of wireless Internet access"
- Jing Xu – University of California at Santa Barbara, 2018, "Spatial variability in retail gasoline pricing behavior"
- Sharisse Fisher – Arizona State University, 2013, "A spatial decision support system for optimizing the environmental rehabilitation of borderlands" (Geographic Information Specialist, Bureau of Land Management)
- Stephanie Kleinschmidt – Arizona State University, 2013, "Positional uncertainty in spatial data and its effect on cluster detection" (GIS Specialist, Gradient)
- George Oliver – Arizona State University, 2012, "Modeling the influence of vehicle characteristics on carsharing utilization" (Software Engineer, CARMERA)
- Paul Padegimas – Arizona State University, 2011 (Project Manager, UNICO Engineering)
- Jeffrey Olson – Ohio State University, 2007, "Map projection and coverage modeling at a continental scale" (Associate Professor, University of Wisconsin-Whitewater)

- Diane Snediker – Ohio State University, 2007, "Decision support for network disruption mitigation" (Geographer, U.S. Census Bureau)
- Brian Chastain – Ohio State University, 2005, "A comparative analysis of methods for imposing spatial structure in forest harvest scheduling" (Consultant, Geospatial Data Science, General Dynamics)
- Darlene Magold – Ohio State University, 2004, "Evaluating development in urban floodplains using geographical information systems and spatial analysis techniques" (Chief Executive Officer, Etch / MTECH)
- Amanda Trepac (now Zaza) – Ohio State University, 2004, "Comparative evaluation of environmental justice concerns in transportation project assessment" (Manager, Global Strategic Development and GIS, The Wendy's Company)
- David Twehues – Ohio State University, 2004, "Evaluating the emergency warning siren system in Columbus, Ohio" (Head of Marketing, Europe, Wayfair)
- Robert Henry – Ohio State University, 2003, "Linking spatial, temporal, and spatio-temporal aspects of auto thefts with criminological theory and time-specific analysis" (Sr. GIS Application Consultant, CentralSquare Technologies)
- Erick Lobao – Ohio State University, 2002, "Exploratory spatial analysis of homelessness and shelter system perceptions in Columbus, Ohio" (Enterprise Data Coordinator, City of Columbus)
- Xiaolan Wu – Ohio State University, 2002, "Estimating balance velocities using GIS-based spatial analytical techniques" (Credit Risk Statistical Modeler, KeyBank)
- Ho-Seop Cha – Ohio State University, 2001, "Assessing public transit service equity in Columbus, Ohio" (Assistant Professor, Park University)

Master's (committee member) (13 total)

- Carlos Baez – University of California at Santa Barbara, 2017
- Jillian Elder – Arizona State University, 2009
- Miti Gupta – Ohio State University (Allied Medical Professions), 2008
- Mark Sundermeier – Ohio State University, 2008
- Dingmou Li – Ohio State University, 2007
- Michael Niedzielski – Ohio State University, 2005
- Daoqin Tong – Ohio State University (Civil Engineering), 2004
- Joni Downs – Ohio State University (Natural Resources), 2004
- Youngho Kim – Ohio State University, 2003
- Tzu-Lung Sun – Ohio State University (Civil Engineering), 2002
- Sunhee Sang – Ohio State University, 2002
- Richard Healy – Ohio State University, 2001
- Enzhou Wang – Ohio State University, 2001

Master's (external reviewer) (1 total)

- Dime Kekana – University of Cape Town, Engineering and the Built Environment, 2019

Undergraduate (advisor) (11 total)

- Luis Validivia – University of California at Santa Barbara (College of Creative Studies, Mathematics), 2021
- Haoyu Shi – University of California at Santa Barbara, 2020
- Menghan Jiao – University of California at Santa Barbara, 2019-20
- Jiamin Tan – University of California at Santa Barbara, 2019-20
- Victoria Murillo – University of California at Santa Barbara (Statistical and Applied Probability), 2019
- Thomas Crimmel – University of California at Santa Barbara, 2018
- Danny Kolosta – University of California at Santa Barbara, 2018
- Wendy Gao – University of California at Santa Barbara (Statistics and Applied Probability), 2018
- Landon Settle (Senior thesis) – University of California at Santa Barbara (College of Creative Studies, Mathematics), 2017, "Nonlinear optimization of contiguity-constrained multiple linear regression including an indicator variable"
- Tess Irving-Ruffing – University of California at Santa Barbara, 2016-17
- Alecia Radatz (Honors thesis) – Arizona State University, 2010, "Public transit and faith communities: a transportation geography analysis with regards to the religious divisions of Belfast"

Research Funding

i. Submitted

ii. *Awarded* (34 total; $7,557,601 as PI or Co-PI)

2022-2023 Murray, A., L. Carvalho, C. Jones, D. Roberts and M. Moritz. *Wildfire Resilience Initiative*. Office of Research, $1,000,000.

2020-2021 Church, R. and A. Murray. *The Development of Spatial Optimization Tools to Support Efforts to Transition to Fire Resilient Forest Landscapes*. USDA Forest Service / Pacific Southwest Forest And Range Experiment Station, $94,901.

2020-2022 Cassels, S., A. Murray P. Gorbach and A. Vaughan. *Activity Spaces for HIV Risk and Prevention Among Diverse Men Who Have Sex with Men in Los Angeles*. National Institutes of Health, $401,769.

2017-2023 Carvalho, L., A. Murray, C. Jones, D. Roberts and R. Church. *PREEVENTS Track 2: Understanding Extreme Fire Weather Hazards and Improving Resilience in Coastal Santa Barbara, California*. National Science Foundation, $1,508,987.

2017-2018 King, J., K. Caylor, D. Harlow and A. Murray. *Creating an Augmented-Reality Sandbox for Teaching and Learning about Earth Surfaces (CASTLES)*. University of California (Faculty Outreach Grants, Office of Education Partnerships – UCSB), $15,253.

2014 Murray, A. *Mitigating Costs, Light pollution and Safety through Spatial Analysis and Strategic Planning in Public Lighting*. Arizona State University (College of Liberal Arts and Sciences NS-SS-GRG / SGSUP), $48,520.

2012-2014 Grubesic, T., L. Tabb and A. Murray. *Collaborative Research: Spatial Cluster Detection Based on Contiguity*. National Science Foundation, $350,000.

2010-2011 Agadjanian, V., S. Hayford and A. Murray. *Childbearing Dynamics in Setting of High HIV Prevalence and Massive ART Rollout*. National Institutes of Health, $243,000.

2010-2015 Gober, P., C. Redman, C. Kirkwood, M. Nelson and D. White. *Decision Center For A Desert City II: Urban Climate Adaptation*. National Science Foundation, $7,503,929 (Murray as Senior Project Personnel).

2009-2012 Murray, A. *Improving Survival From Sudden Cardiac Arrest: A Regional Geospatial Analysis*. American Heart Association (subcontract from Ohio State University), $127,500.

2009-2011 Murray, A., M. Griffin, S. Rey and T. Grubesic. *Collaborative Research: Spatial Analytical Framework for Examining Sex Offender Residency Issues over Space and Time*. National Science Foundation, $250,000.

2009-2024 Murray, A. *International Regional Science Review*. Sage, 384,000.

2007-2009 Matisziw, T., A. Murray and T. Grubesic. *Collaborative Research: Mitigating Disaster and Terrorism Impacts to Critical Infrastructure*. National Science Foundation, $234,197.

2006-2007 Murray, A. and J. Borstad. *Exploration of spatio-temporal variation in sedentary lifestyles*. The Ohio State University (Initiative in Population Research), $39,573.

2006-2008 Murray, A. *Housing Deed Transfers in Ohio*. Western Ohio Research Consortium and Ohio Urban University Program, $85,000 ($60K in 2006 and $25K in 2007).

2005-2007 Murray, A. *Geographic Representation in Location Coverage Modeling*. National Science Foundation (BCS-0518967), $180,000.

2004-2007 Parent, R., R. Machiraju, J. Davis, D. Woods and A. Murray. *Multi-level, active attention surveillance*. National Science Foundation (IIS-0428249), $1,300,000.

2004-2009 Culver, D., J. Reutter, A. Randall, K. Bedford and E. Irwin. *Large lake ecosystems: modeling interactions among human, biological, and physical processes*. National Science Foundation - Biocomplexity, $1,399,923 (A. Murray as Senior Personnel – Associate Investigator).

2004-2005 Murray, A. *Emergency warning siren coverage in Franklin County: Analysis and Modeling*. The Ohio State University (Center for Urban and Regional Analysis), $30,258.

2004-2008 Stimson, R., M. Bell, J. Mangan, K. Burrage, T. Wilson, D. Pullar, A. Murray, A. Skinner, P. Crossman, R. Barker, A. Taylor. *An Integrated Large Scale Urban*

Model and Spatial Decision Support System Simulating Growth and Evaluating Sustainability Outcomes for Southeast Queensland. Australian Research Council, AUD$420,000 (Principal Investigator).

2002-2003 Kraybill, D., H. Morrow-Jones, A. Murray and L. Lobao. *Economic growth and local environmental policies*. The Ohio State University (Environmental Policy Initiative), $27,975.

2001-2004 Murray, A. *Spatial representation and modeling in natural resource management.* National Science Foundation (BCS-0114362), $130,009.

2001 Murray, A. *Airborne techniques for estimating traffic flow in the private sector*. US Department of Transportation through National Consortia on Remote Sensing in Transportation - Flows (NCRST-F), $30,000

2001 Murray, A. *Spatial analysis of homeless shelters in Columbus, Ohio*. Community Shelter Board, $5,520.

2000-2001 Murray, A. and W. Ackerman. *Geo-coding Lima crime data for 2000/2001 and preliminary analysis*. Lima Police Department, $7,500 ($3,000 in 2000 and $4,500 in 2001).

2000 Murray, A. *Use and integration of geographic information systems and spatial analysis techniques for identifying patterns of urban crime*. The Ohio State University (Committee on Urban Affairs), $20,000.

2000 Murray, A. *Geographic information systems based approaches for assessing regional public transportation coverage*. The Ohio State University (Office of Research Seed Grant), $17,499.

1999-2001 Estivill-Castro, V. and A. Murray. *Clustering for knowledge discovery, pattern spotting and exploratory analysis in spatial databases.* Australian Research Council, AUD$150,000 (Associate Investigator after 9/99).

1999 Stimson, R., D. Wadley, A. Murray and D. Rudd. *Potential roles for the retirement village industry in providing appropriate affordable housing alternatives in an ageing Australian society.* Australian Research Council, AUD$50,000.

1999 Phinn, S. and A. Murray. *Monitoring urban growth using multi-temporal satellite images and spatial models*. Australian Research Council, AUD$19,500.

1998-2000 Stimson, R. and A. Murray. *Spatial data systems for evaluating regional performance in Queensland to inform strategies for managing growth and decline*. Australian Research Council, AUD$180,700 (Associate Investigator after 9/99).

1997-1999 Murray, A. *Decision support systems for planning urban growth and development*. Australian Research Council, AUD$122,000.

1997 Estivill-Castro, V. and A. Murray. *Knowledge discovery, pattern spotting and data analysis in geographical information systems*. Australian Research Council, AUD$14,000.

1997 Murray, A. and B. Roberts. *Analysing and modelling spatial corporate structure*. Australian Housing and Urban Research Institute, AUD$15,200.

1997 Murray, A. *Modelling aggregation in input-output systems.* Queensland University of Technology, AUD$6,000.

Meetings and Conference Presentations

2022 S. Burtner and A.T. Murray. "Extracting movement from text." *2022 American Association of Geographers Annual Meeting*, February 25-March 1, 2022.

2022 J. Xu, A.T. Murray, R.L. Church and R. Wei. "Service allocation equity modeling." *2022 American Association of Geographers Annual Meeting*, February 25-March 1, 2022.

2022 S. Cho, A.T. Murray and S. Dodge. "Exploring spatial unit effect on spatial optimization." *2022 American Association of Geographers Annual Meeting*, February 25-March 1, 2022.

2022 A.T. Murray, R.L. Church, B.A. Pludow and P. Stine. "Wildfire mitigation land use modeling." *Western Regional Science Association 61st Annual Meeting*, Scottsdale, Arizona, USA, February 17-20, 2022.

2022 A.T. Murray, R.L. Church, B.A. Pludow and P. Stine. "Location analytics for transitioning to fire resilient landscapes." *55th Hawaii International Conference on System Sciences*, January 4-7, 2022.

2021 A.T. Murray, R.L. Church and J. Baik. "Addressing multiple resource possibilities in the Weber model." *68th North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 10-13, 2021.

2021 B.A. Pludow and A.T. Murray. "Evaluating Wildfire risk reduction scenarios in the wildland-urban interface." *68th North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 10-13, 2021.

2021 S. Cho, A.T. Murray and S. Dodge. "Solving a location-allocation problem that addresses access and coverage." *68th North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 10-13, 2021.

2021 A.T. Murray and J. Baik. "A spatial algorithm to identify all non-dominated solutions in coverage and access optimization." *INFORMS*, Anaheim, California, USA, October 24-27, 2021.

2021 A.T. Murray, A. Ortiz and S. Cho. "Location analytics for strategic defense in baseball." *International Symposium on Locational Decisions XV*, July 5-9, 2021.

2021 H. Chen and A.T. Murray. "Open-source geospatial software for location cover models." *GISRUK 2021*, April 14-16, 2021.

2021 A. Pludow and A.T. Murray. "Spatial variability of demographic characteristics in zones of high wildfire risk." *2021 Annual Meeting of the American Association of Geographers*, April 7-11, 2021.

2021 J. Baik and A.T. Murray. "Strategic location that accounts for access and coverage." *2021 Annual Meeting of the American Association of Geographers*, April 7-11, 2021.

2021 J. Xu, A.T. Murray, R.L. Church and R. Wei. "Service allocation equity modeling." *2021 Annual Meeting of the American Association of Geographers*, April 7-11, 2021.

2021 S. Cho, A. Murray and S. Dodge. "Bi-objective optimization applying multi-weber problem and planar maximal covering location problem." *2021 Annual Meeting of the American Association of Geographers*, April 7-11, 2021.

2021 S. Burtner and A.T. Murray. "Spatial movement in natural language expressions." *2021 Annual Meeting of the American Association of Geographers*, April 7-11, 2021.

2021 A.T. Murray. "Facilitated access to spatial analytics." *Western Regional Science Association 60th Annual Meeting*, February 22-25, 2021.

2021 A.T. Murray. "Replicability challenges in location analytics." 54th *Hawaii International Conference on System Sciences*, January 4-8, 2021.

2020 B.A. Pludow and A.T. Murray. "Strategic reduction of wildfire risk in the wildland-urban interface." *67th North American Meetings of the Regional Science Association International*, November 9-13, 2020.

2020 E. Noi and A.T. Murray. "Spatial sampling configuration for air quality network monitoring." *67th North American Meetings of the Regional Science Association International*, November 9-13, 2020.

2020 S. Burtner and A.T. Murray. "COVID-19 and minimizing spatial interactions in micro-spatial environments." *67th North American Meetings of the Regional Science Association International*, November 9-13, 2020.

2020 H. Chen and A.T. Murray. "Open source approaches for location coverage modelling." *2020 Annual Meeting of the American Association of Geographers*, April 6-10, 2020.

2019 H. Goto and A.T. Murray. "Acoustical impacts in coverage modeling." *66th North American Meetings of the Regional Science Association International*, Pittsburgh, Pennsylvania, USA, November 13-16, 2019.

2019 B.A. Pludow and A.T. Murray. "Socio-demographic characteristics at the wildland-urban interface and wildfire risk mitigation." *66th North American Meetings of the Regional Science Association International*, Pittsburgh, Pennsylvania, USA, November 13-16, 2019.

2019 S. Burtner and A.T. Murray. "Making the 'neighborhood': Using spatial clustering of travel activity to inform neighborhood delineations." *66th North American Meetings of the Regional Science Association International*, Pittsburgh, Pennsylvania, USA, November 13-16, 2019.

2019 A.T. Murray. "Geocomputation and spatial analytics." *GeoComputation 2019*, Queenstown, New Zealand, September 18-21, 2019.

2019 A.T. Murray, R.L. Church, J. Xu, L. Carvalho, C. Jones and D. Roberts. "Coastal vulnerability under extreme fire weather." *2019 Applied Geography Commission*, Gran Sasso Science Institute, L'Aquila, Italy, June 17-19, 2019.

2019 J. Xu, A.T. Murray, Z. Wang and R.L. Church. "Facility workloads in covering modeling." *2019 Annual Meeting of the American Association of Geographers*, Washington D.C., USA, April 3-7, 2019.

2019 A. Pludow and A.T. Murray. "Land use conflicts associated with growth and development." *2019 Annual Meeting of the American Association of Geographers*, Washington D.C., USA, April 3-7, 2019.

2019 X. Feng and A.T. Murray. "Location and allocation under spatiotemporal heterogeneity: A case of optimizing drone-equipped stations." *2019 Annual Meeting of the American Association of Geographers*, Washington D.C., USA, April 3-7, 2019.

2019 S. Burtner and A.T. Murray. "Social mobility and segregation examined through networked behavior." *2019 Annual Meeting of the American Association of Geographers*, Washington D.C., USA, April 3-7, 2019.

2019 E. Noi and A.T. Murray. "Urban sensing optimization and sampling." *2019 Annual Meeting of the American Association of Geographers*, Washington D.C., USA, April 3-7, 2019.

2018 A.T Murray, J. Xu, Z. Wang and R.L. Church. "Issues and challenges in capacitated coverage modeling." *65th North American Meetings of the Regional Science Association International*, San Antonio, Texas, USA, November 7-10, 2018.

2018 A.T Murray, X. Feng and R.L. Church. "Allocation complexities in single facility siting." *65th North American Meetings of the Regional Science Association International*, San Antonio, Texas, USA, November 7-10, 2018.

2018 X. Feng, A.T Murray and R.L. Church. "Medical drone delivery: optimizing location and allocation under spatiotemporal heterogeneity." *65th North American Meetings of the Regional Science Association International*, San Antonio, Texas, USA, November 7-10, 2018.

2018 B.A. Pludow and A.T Murray. "Wireless access coverage in an urban area." *65th North American Meetings of the Regional Science Association International*, San Antonio, Texas, USA, November 7-10, 2018.

2018 I. Hong and A.T. Murray. "Deriving obstacle-avoiding service coverage on Euclidean plane." *65th North American Meetings of the Regional Science Association International*, San Antonio, Texas, USA, November 7-10, 2018.

2018 A.T. Murray. "GIS and the subtle proliferation of optimization." *INFORMS*, Phoenix, Arizona, USA, November 4-7, 2018.

2018 A.T. Murray, X. Feng and A. Shokoufandeh. "Heterogeneous skeleton for summarizing continuously distributed demand in a region." *GIScience 2018*, Melbourne, Victoria, Australia, August 28-31, 2018.

2018 H. Goto and A.T. Murray. "Coverage planning to account for acoustical properties associated with emergency warning sirens." *29th European Conference on Operational Research*, Valencia, Spain, July 8-11, 2018.

2018 X. Feng, S. Wang, S. Gao, Y. Cao and A.T. Murray. "Optimizing activity locations in GIS using a multi-objective trajectory approach." *UCGIS 2018 Symposium and CaGIS AutoCarto*, Madison, Wisconsin, USA, May 22-24, 2018.

2018 J. Xu and A.T. Murray. "Assessment of commercial location analytics." *2018 Annual Meeting of the American Association of Geographers*, New Orleans, Louisiana, USA, April 10-14, 2018.

2018 J. Xu and A.T. Murray. "Spatial analytics for exploring retail gasoline price variability." *Western Regional Science Association 57th Annual Meeting*, Pasadena, California, USA, February 11-14, 2018.

2018 X. Feng and A.T. Murray. "Addressing spatial allocation: planning for drone-based emergency medical service." *Western Regional Science Association 57th Annual Meeting*, Pasadena, California, USA, February 11-14, 2018.

2018 D. Tong and A.T. Murray. "Location analysis: developments on the horizon." *Western Regional Science Association 57th Annual Meeting*, Pasadena, California, USA, February 11-14, 2018.

2017 A.T Murray. "Hidden yet there: regional analytics in GIS." *64th North American Meetings of the Regional Science Association International*, Vancouver, British Columbia, Canada, November 8-11, 2017.

2017 A.T. Murray and J. Xu. "GIS based location analytics: empirical performance characteristics." *64th North American Meetings of the Regional Science Association International*, Vancouver, British Columbia, Canada, November 8-11, 2017.

2017 H. Goto and A.T. Murray. "Exact optimal solution of a critical chain project management problem." *Industrial Engineering and Operations Management Conference*, Bogota, Columbia, October 25-26, 2017.

2017 A.T. Murray, R. Wei and R.L. Church. "Understanding and mitigating risks and uncertainty in harvest scheduling." *2017 Symposium on Systems Analysis in Forest Resources*, Suquamish, Washington, USA, August 27-30, 2017.

2017 J. Yao and A.T. Murray. "Location modeling to support sustainable land use planning." *International Symposium On Locational Decisions (ISOLDE) XIV*, Toronto, Ontario, Canada, July 9-14, 2017.

2017 I. Hong, M. Kuby and A.T. Murray. "A range-restricted recharging station coverage model for drone delivery service planning." *International Symposium On Locational Decisions (ISOLDE) XIV*, Toronto, Ontario, Canada, July 9-14, 2017.

2017 A.T. Murray and X. Feng. "Allocation problem solved through Voronoi diagram in heterogeneous space." *International Symposium On Locational Decisions (ISOLDE) XIV*, Toronto, Ontario, Canada, July 9-14, 2017.

2017 X. Feng and A.T. Murray. "Heterogeneous Voronoi diagram." *2017 Annual Meeting of the American Association of Geographers*, Boston, Massachusetts, USA, April 5-9, 2017.

2017 J. Xu and A.T. Murray. "Detection of nighttime street lighting." *2017 Annual Meeting of the American Association of Geographers*, Boston, Massachusetts, USA, April 5-9, 2017.

2016 A.T Murray. "The evolving location analytics toolbox." *63rd North American Meetings of the Regional Science Association International*, Minneapolis, Minnesota, USA, November 9-12, 2016.

2016 X. Feng and A.T Murray. "Heterogeneous space facility siting in order to maximize coverage." *63rd North American Meetings of the Regional Science Association International*, Minneapolis, Minnesota, USA, November 9-12, 2016.

2016 Y. Zhang, A.T Murray and B.L Turner. "Optimizing green space locations to reduce daytime and nighttime urban heat island effects in Phoenix, Arizona." *63rd North American Meetings of the Regional Science Association International*, Minneapolis, Minnesota, USA, November 9-12, 2016.

2016 K. Grace, R. Wei and A.T. Murray. "Merging population and environmental data to construct a spatial analytic framework for assessing and improving food aid distribution." *2016 Annual Meeting of the Population Association of America*, Washington, D.C., USA, March 31-April 2, 2016.

2016 A.T. Murray. "Optimizing school summer break scheduling." *2016 Annual Meeting of the American Association of Geographers*, San Francisco, California, USA, March 29-April 2, 2016.

2016 X. Feng and A.T. Murray. "Street light coverage optimization." *2016 Annual Meeting of the American Association of Geographers*, San Francisco, California, USA, March 29-April 2, 2016.

2016 A.T. Murray and I. Hong. "Path optimization through complex environments based on spatial knowledge." *LAND-TRANSLOG III*, Santa Cruz, Chile, March 13-17, 2016

2016 A.T. Murray. "Strategic scheduling of summer break in K-12 traditional school year planning." *Western Regional Science Association 55th Annual Meeting*, Hawaii, USA, February 14-17, 2016.

2015 I. Hong, M. Kuby and A. Murray. "Deviation flow refueling location model for continuous space: commercial drone delivery system for urban area." *13th International Conference of GeoComputation*, Dallas, Texas, USA, May 20-23, 2015.

2015 H.A. Fischer, A.T. Murray and L. Conrow. "Siting bicycle service stations in an urban area." *2015 Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, April 21-25, 2015.

2015 I. Hong, M. Kuby and A.T. Murray. "Locating recharging stations for commercial drone delivery in urban areas." *2015 Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, April 21-25, 2015.

2015 R. Wei and A.T. Murray. "A parallel algorithm for the efficient solution of continuous space set coverage problem." *2015 Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, April 21-25, 2015.

2015 A.T. Murray. "Evolving spatial analytics and rural area classifications." *Rationalizing Rural Area Classifications*, National Academies of Science, Committee on National Statistics (sponsored by Economic Research Service, U.S. Department of Agriculture), Washington, D.C., USA, April 16-17, 2015.

2015 T. Grubesic, A.T. Murray and R. Wei. "Alcohol outlet access in the state of Washington." *Western Regional Science Association 54th Annual Meeting*, Tucson, Arizona, USA, February 15-18, 2015.

2014 A.T. Murray and X. Feng. "Street light coverage optimization." *61st North American Meetings of the Regional Science Association International*, Washington, D.C., USA, November 12-15, 2014.

2014 R. Wei and A.T. Murray. "A high performance computing approach for solving the continuous space set coverage problem." *61st North American Meetings of the Regional Science Association International*, Washington, D.C., USA, November 12-15, 2014.

2014 L.J. Wolf, W. Li, C. Fan and A.T. Murray. "Detecting racial gerrymandering using normalized mass moment of inertia methods." *61st North American Meetings of the Regional Science Association International*, Washington, D.C., USA, November 12-15, 2014.

2014 I. Hong, A.T. Murray and L.J. Wolf. "Shortest path travel around obstacles: enhanced spatial processing." *61st North American Meetings of the Regional Science Association International*, Washington, D.C., USA, November 12-15, 2014.

2014 A.T. Murray. "Geospatial technologies for natural resource management." *The 2nd Saudi International Environmental Technologies Conference 2014*, Riyadh, Saudi Arabia, November 10-12, 2014.

2014 R. Wei and A. Murray. "High performance computing to optimize spatial coverage." *INFORMS*, San Francisco, California, USA, November 9-12, 2014.

2014 Y. Zhang, A. Murray and K. Wang. "Mitigating urban heat island effects through strategic park siting." *INFORMS*, San Francisco, California, USA, November 9-12, 2014.

2014 A.T. Murray Q. Zhao and E. Wentz. "Shade optimization in a desert environment." *GIScience 2014*, Vienna, Austria, September 24-26, 2014.

2014 A.T. Murray. "Maximal coverage: application, solution, evolution and continued significance." ISOLDE XIII, Naples and Capri, Italy, June 16-20, 2014.

2014 Q. Zhao, E.A. Wentz and A.T. Murray. "Shade optimization in a desert environment." *2014 Annual Meeting of the Association of American Geographers*, Tampa, Florida, USA, April 8-14, 2014.

2014 I. Hong, A.T. Murray and S.J. Rey. "High performance computing to derive obstacle-avoiding shortest paths." *2014 Annual Meeting of the Association of American Geographers*, Tampa, Florida, USA, April 8-14, 2014.

2014 L.J. Wolf, I. Hong and A.T. Murray. "Complexity bounds for deriving a shortest Euclidean path." *2014 Annual Meeting of the Association of American Geographers*, Tampa, Florida, USA, April 8-14, 2014.

2014 T.H. Grubesic, A.T. Murray, R. Wei and F. Wei. "Essential air service in the United States: Exploring strategies to enhance spatial and operational efficiencies." *Western Regional Science Association 53rd Annual Meeting*, San Diego, California, USA, February 16-19, 2014.

2013 A.T. Murray, T. Grubesic and R. Wei. "Spatial cluster detection and interpretation." *6th International Conference of the ERCIM WG on Computational and Methodological Statistics (ERCIM 2013)*, London, UK, December 14-16, 2013.

2013 A.T. Murray. "Forty years of maximal coverage location modeling." *60th North American Meetings of the Regional Science Association International*, Atlanta, Georgia, USA, November 13-16, 2013.

2013 R. Wei and A.T. Murray. "Continuous space siting for maximal coverage." *60th North American Meetings of the Regional Science Association International*, Atlanta, Georgia, USA, November 13-16, 2013.

2013 A.T. Murray, T.H. Grubesic and R. Wei. "Maximal coverage and data envelopment analysis in evaluating rural air transport in the US." *60th North American Meetings of the Regional Science Association International*, Atlanta, Georgia, USA, November 13-16, 2013.

2013 T.H. Grubesic, A.T. Murray and R. Wei. "Evaluating the spatial precision of cluster detection approaches." *60th North American Meetings of the Regional Science Association International*, Atlanta, Georgia, USA, November 13-16, 2013.

2013 I. Hong and A.T. Murray. "Efficient wayfinding in complex environment: derivation of a continuous space shortest path." *6th ACM SIGSPATIAL International Workshop on Computational Transportation Science*, Orlando, Florida, USA, November 5, 2013

2013 A.T. Murray and I. Hong. "Navigating complex environments." *INFORMS*, Minneapolis, Minnesota, USA, October 6-9, 2013.

2013 R. Wei, A.T. Murray and R. Batta. "A bounding based solution approach for the continuous arc covering problem." *INFORMS*, Minneapolis, Minnesota, USA, October 6-9, 2013.

2013 R. Wei and A. T. Murray. "Assessing continuous demand representation in coverage modeling." *12th International Conference on GeoComputation*, Wuhan, China, May 23-25, 2013.

2013 A.T. Murray and I. Hong. "Finding my way." *2013 Annual Meeting of the Association of American Geographers*, Los Angeles, New California, USA, April 9-13, 2013.

2013 J. Yao, A.T. Murray and V. Agadjanian. "Geographical access to sexual and reproductive health care for women in rural Mozambique." *2013 Annual Meeting of the Association of American Geographers*, Los Angeles, New California, USA, April 9-13, 2013.

2013 R. Wei and A.T. Murray. "Continuous demand representation to support coverage modeling." *2013 Annual Meeting of the Association of American Geographers*, Los Angeles, New California, USA, April 9-13, 2013.

2013 P.V. Amaral and A.T. Murray. "Spatial allocation of dialysis machines in Brazil." *2013 Annual Meeting of the Association of American Geographers*, Los Angeles, New California, USA, April 9-13, 2013.

2013 T. Grubesic, A.T. Murray and L. Tabb. "Evaluating spatial precision of approaches for irregularly shaped spatial cluster detection." *2013 Annual Meeting of the Association of American Geographers*, Los Angeles, New California, USA, April 9-13, 2013.

2013 A.T. Murray. "Expanding fire station service provision." *Western Regional Science Association 52nd Annual Meeting*, Santa Barbara, California, USA, February 24-27, 2013.

2013 R. Wei and A.T. Murray. "Spatial uncertainty challenges in location modeling with dispersion requirements." *Western Regional Science Association 52nd Annual Meeting*, Santa Barbara, California, USA, February 24-27, 2013.

2013 T.H. Grubesic, A.T. Murray and T.C. Matisziw. "Putting a price on politics as usual: Rural air transport in the United States." *Western Regional Science Association 52nd Annual Meeting*, Santa Barbara, California, USA, February 24-27, 2013.

2013 J. Yao and A.T. Murray. "Evaluation of health care facility locations: A case study in rural Mozambique." *Western Regional Science Association 52nd Annual Meeting*, Santa Barbara, California, USA, February 24-27, 2013.

2012 W.A. Pridemore, T. Grubesic, A.T. Murray, L.P. Tabb, Y. Liu and R. Wei. "Using spatial optimization modeling to examine alcohol beverage control and to estimate future dispersion of alcohol outlets." *68th Annual Meeting of The American Society of Criminology*, Chicago, Illinois, USA, November 14-17, 2012.

2012 A.T. Murray, R. Wei and T.H. Grubesic. "Spatial contiguity in cluster detection." *59th North American Meetings of the Regional Science Association International*, Ottawa, Ontario, Canada, November 7-10, 2012.

2012 T.H. Grubesic, A.T. Murray and T. Matisziw."Putting a price on politics as usual rural air transport in the United States." *59th North American Meetings of the Regional Science Association International*, Ottawa, Ontario, Canada, November 7-10, 2012.

2012 R. Wei and A.T. Murray. "Evaluating polygon overlay to support coverage modeling." *59th North American Meetings of the Regional Science Association International*, Ottawa, Ontario, Canada, November 7-10, 2012.

2012 T.H. Grubesic, A.T. Murray, R. Wei, J. Yao and W. Lazarus. "Model support for school boundary planning." *59th North American Meetings of the Regional Science Association International*, Ottawa, Ontario, Canada, November 7-10, 2012.

2012 A.T. Murray. "Positional uncertainty in coverage modeling. *INFORMS*, Phoenix, Arizona, USA, October 14-17, 2012.

2012 A.T. Murray, T.H. Grubesic, S. Rey and L. Anselin. "Spatial data uncertainty and cluster detection." *GIScience 2012*, Columbus, Ohio, USA, September 18-21, 2012.

2012 R. Wei and A.T. Murray. "Achieving dispersive goals and objectives in locational planning." *GIScience 2012*, Columbus, Ohio, USA, September 18-21, 2012.

2012 A.T. Murray and I. Hong. "Deriving shortest distance in the presence of obstacles." *ISOLDE XII*, Nagoya and Kyoto, Japan, July 19-24, 2012.

2012 R. Wei and A.T. Murray. "A facility dispersion heuristic in the case of spatial uncertainty." *ISOLDE XII*, Nagoya and Kyoto, Japan, July 19-24, 2012.

2012 J. Yao and A.T. Murray. "Assessment of sexual and reproductive health service location in rural Mozambique." *ISOLDE XII*, Nagoya and Kyoto, Japan, July 19-24, 2012.

2012 A.T. Murray. "基調講演." *15th Symposium CSIS*. Center for Spatial Information Science, University of Tokyo, Tokyo, Japan, July 19, 2012.

2012 M. Cudnik, J. Yao, A.T. Murray, S Pennington and J. Christenson. "Does GIS-derived transport time prediction reflect actual transport times in out of hospital cardiac arrest patients?" *Society for Academic Emergency Medicine 2012 Annual Meeting*, Chicago, Illinois, USA, May 9-12, 2012.

2012 R. Wei and A.T. Murray. "Spatial uncertainty in forest management planning." *2012 Annual Meeting of the Association of American Geographers*, New York, New York, USA, February 24-28, 2012.

2012 S. Kleinschmidt, A.T. Murray, S.J. Rey and T.H Grubesic. "Spatial patterns and geographic data uncertainty." *2012 Annual Meeting of the Association of American Geographers*, New York, New York, USA, February 24-28, 2012.

2012 J. Yao and A.T. Murray. "Continuous surface representation and approximation: spatial analytical implications." *2012 Annual Meeting of the Association of American Geographers, New York*, New York, USA, February 24-28, 2012.

2012 Y. Liu, A.T. Murray and S.J. Rey. "Local patterns of movement behavior." *2012 Annual Meeting of the Association of American Geographers*, New York, New York, USA, February 24-28, 2012.

2012 A.T. Murray and D. Tong. "Regional science and spatial optimization. *Western Regional Science Association 51st Annual Meeting*, Poipu, Kauai, Hawaii, USA, February 8-11, 2012.

2011 A.T. Murray and R. Wei. "Spatial coverage modeling: bounds for eliminating representational error." *LAND-TRANSLOG II*, Puerto Varas, Chile, December 12-15, 2011.

2011 A.T. Murray, R. Wei, E.A. Mack and T.H. Grubesic. "Spatio-temporal geocoding to support rehabilitative services provision." *First International Geospatial Geocoding Conference*, Esri Conference Center, Redlands, California, USA, December 6-7, 2011.

2011 A.T. Murray and R. Wei. "Addressing spatial uncertainty in dispersion modeling." *INFORMS*, Charlotte, North Carolina, USA, November 13-16, 2011.

2011 A.T. Murray and R. Wei. "Computational bounds for location set covering." *58th Annual North American Meetings of the Regional Science Association International*, Miami, Florida, USA, November 9-12, 2011.

2011 R. Wei and A.T. Murray. "Multi-objective models that address spatial uncertainty." *58th Annual North American Meetings of the Regional Science Association International*, Miami, Florida, USA, November 9-12, 2011.

2011 T.H. Grubesic, A.T. Murray, W.A. Pridemore and L. Philip-Tabb. "Managing the spatial distribution of alcohol outlets with the intent of reducing violence." *58th Annual North American Meetings of the Regional Science Association International*, Miami, Florida, USA, November 9-12, 2011.

2011 L. Philip Tabb, T.H. Grubesic, W.A. Pridemore and A. Murray. "The spatial distribution of alcohol outlets and assaultive violence in the City of Philadelphia: developing a new spatial scan statistic." *2011 Joint Statistical Meetings*, Miami, Florida, USA, July 30 - August 4, 2011.

2011 R. Wei and A.T. Murray. "An integrated approach for addressing spatial uncertainty in a spatial optimization model." *UCGIS Summer Assembly*, Boulder, Colorado, USA, June 22-23, 2011.

2011 A.T. Murray, I. Hong and R. Wei. "Comparison techniques for solving an implicit coverage model." *2011 Annual Meeting of the Association of American Geographers*, Seattle, Washington, USA, April 12-16, 2011.

2011 X. Kang, S.J. Rey and A.T. Murray. "Regionalization approaches for ESDA: implementation and evaluation in PySAL." *2011 Annual Meeting of the Association of American Geographers*, Seattle, Washington, USA, April 12-16, 2011.

2011 F. Li, S.J. Rey and A.T. Murray. "Cluster detection methods in PySAL." *2011 Annual Meeting of the Association of American Geographers*, Seattle, Washington, USA, April 12-16, 2011.

2011 J. Yao, A.T. Murray, V. Agadjanian and S. Hayford. "Exploratory spatial analysis of sexual and reproductive health services utilization in rural Mozambique." *2011 Annual Meeting of the Association of American Geographers*, Seattle, Washington, USA, April 12-16, 2011.

2011 S.J. Rey, A.T. Murray and L. Anselin. "Visualizing regional income distribution dynamics." *Western Regional Science Association 50th Annual Meeting*, Monterey, California, USA, February 27-March 2, 2011.

2010 A.T. Murray. "Vulnerability reduction through strategic protection." *57th Annual North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 11-13, 2010.

2010 T.H. Grubesic, T.C. Matisziw and A.T. Murray. "Optimizing essential air service (EAS) airport locations." *57th Annual North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 11-13, 2010.

2010 J. Yao and A.T. Murray. "Siting a single facility to best serve an area." *57th Annual North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 11-13, 2010.

2010 R. Wei and A.T. Murray. "Intelligent identification of dispersion constraints in spatial optimization problems." *57th Annual North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 11-13, 2010.

2010 P.D. Padegimas and A.T. Murray. "Cooperative water management using spatial optimization." *57th Annual North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 11-13, 2010.

2010 Y. Liu and A.T. Murray. "Local measures for assessing movement patterns." *57th Annual North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 11-13, 2010.

2010 A.T. Murray. "Network infrastructure vulnerability mitigation." *INFORMS*, Austin, Texas, USA, November 7-10, 2010.

2010 A.T. Murray, D. Tong and T.H. Grubesic. "Spatial optimization: expanding emergency services to address regional growth and development." *International Geographical Union Applied Geography Commission (CO8.01)*, Ericeira, Portugal, July 18-22, 2010.

2010 A.T. Murray. "Enhancing location optimization modeling capabilities through the use of GIS." *24th European Conference on Operational Research*, Lisbon, Portugal, July 11-14, 2010.

2010 A.T. Murray, Y. Liu, J. Koschinsky and L.A. Brown. "Spatial contagion effects in socio-economic collapse: foreclosure in Columbus Ohio 2003-2007." *2010 Annual Meeting of the Association of American Geographers,* Washington, D.C., USA, April 14-18, 2010.

2010 T.H. Grubesic, T. Matisziw and A.T. Murray. "The impact of urban morphology on sex offender residence restrictions." *2010 Annual Meeting of the Association of American Geographers,* Washington, D.C., USA, April 14-18, 2010.

2010 R. Wei, A.T. Murray, S.J. Rey, T.H. Grubesic and E. Mack. "ESDA for identifying patterns in sex offender residential change." *2010 Annual Meeting of the Association of American Geographers,* Washington, D.C., USA, April 14-18, 2010.

2010 P. Padegimas, A.T. Murray, S. Rey, L. Anselin and P. Gober. "Modeling to support multi-district water management." *2010 Annual Meeting of the Association of American Geographers,* Washington, D.C., USA, April 14-18, 2010.

2010 J. Yao, A.T. Murray, S. Hayford, V. Agadjanian and B. Cau. "Regional variability of women's HIV/AIDS risks: a case study of Gaza, Mozambique." *2010 Annual Meeting of the Association of American Geographers,* Washington, D.C., USA, April 14-18, 2010.

2010 Y. Liu, A.T. Murray, S. Rey and L. Anselin. "Exploring movement patterns." *2010 Annual Meeting of the Association of American Geographers,* Washington, D.C., USA, April 14-18, 2010.

2010 A.T. Murray, Y. Liu, S.J. Rey and L. Anselin. "Exploring movement object patterns." *Western Regional Science Association 49th Annual Meeting*, Sedona, Arizona, USA, February 21-24, 2010.

2009 A.T. Murray. "Evolving spatial detail and complexity in vulnerability assessment modeling." *56th Annual North American Meetings of the Regional Science Association International*, San Francisco, California, USA, November 18-21, 2009.

2009 A.T. Murray, P.D. Padegimas, L. Anselin, S. Rey and P. Gober. "A spatial optimization model for water supply allocation." *56th Annual North American Meetings of the Regional Science Association International*, San Francisco, California, USA, November 18-21, 2009.

2009 T.H. Grubesic, T. Matisziw and A.T. Murray. "Sex offender residence restrictions and urban morphology: a modeling framework and comparative analysis." *56th Annual North American Meetings of the Regional Science Association International*, San Francisco, California, USA, November 18-21, 2009.

2009 L. Brown, A. Murray, J. Koschinsky and Y. Liu. "Spatial contagion effects in socio-economic collapse: foreclosure in Columbus Ohio 2003-2007." *56th Annual North American Meetings of the Regional Science Association International*, San Francisco, California, USA, November 18-21, 2009.

2009 T.H. Grubesic and A.T. Murray. "Spatial uncertainty and location modeling: implications for sex offender mitigation strategies." *INFORMS*, San Diego, California, USA, October 11-14, 2009.

2009 A.T. Murray. "Quantitative geography." Symposium of the 50th Anniversary of the Journal of Regional Science, New York, New York, USA, April 23-24, 2009.

2009 A.T. Murray. "GIS contributions in advancing location science." Location and Network Design (LAND) Workshop, Pucon, Chile, March 22-25, 2009.

2009 A.T. Murray and Y. Liu. "Exploratory spatial data analysis of origin-destination patterns." *2009 Annual Meeting of the Association of American Geographers,* Las Vegas, Nevada, USA, March 22-27, 2009.

2009 P.D. Padegimas and A.T. Murray. "Location modeling software." *2009 Annual Meeting of the Association of American Geographers,* Las Vegas, Nevada, USA, March 22-27, 2009.

2009 J. Corcoran, A.T. Murray and R.J. Stimson. "Spatially disaggregating employment growth estimates." Western Regional Science Association 48th Annual Meeting, Napa Valley, California, USA, February 22-25, 2009.

2008 A.T. Murray. "Location analysis and GIS." *55th Annual North American Meetings of the Regional Science Association International*, Brooklyn, New York, USA, November 19-22, 2008.

2008 D. Tong, H. Wei and A.T. Murray. "Efficient vertex p-center problem solution." *55th Annual North American Meetings of the Regional Science Association International*, Brooklyn, New York, USA, November 19-22, 2008.

2008 T.C. Matisziw, A.T. Murray and T.H. Grubesic. "Accounting for uncertainty in network restoration planning." *55th Annual North American Meetings of the Regional Science Association International*, Brooklyn, New York, USA, November 19-22, 2008.

2008 A.T. Murray and T.C. Matisziw. "Optimizing network infrastructure service recovery." *INFORMS*, Washington, D.C., USA, October 12-15, 2008.

2008 T.H. Grubesic and A.T. Murray. "Optimization models for policy evaluation of sex offender laws." *INFORMS*, Washington, D.C., USA, October 12-15, 2008.

2008 A. Weintraub, M. Goycoolea, A. Murray and J. Vielma. "Imposing maximum clear-cut size constraints in harvest scheduling models: a comparison of three approaches." *CLAIO 2008* (XIV Latin-Ibero American Congress on Operations Research), Cartagena de Indias, Colombia, September 9-12, 2008.

2008 A.T. Murray and R.L. Church. "Location analysis and GIS." *International Symposium on Locational Decisions (ISOLDE) XI*, Santa Barbara, California, USA, June 26 - July 1, 2008.

2008 T.H. Grubesic, T.C. Matisziw and A.T. Murray. "Market coverage and service quality in digital subscriber lines infrastructure planning." *International Symposium on Locational Decisions (ISOLDE) XI*, Santa Barbara, California, USA, June 26 - July 1, 2008.

2008 T.C. Matisziw, A.T. Murray and T.H. Grubesic. "Prioritizing network service restoration." *International Symposium on Locational Decisions (ISOLDE) XI*, Santa Barbara, California, USA, June 26 - July 1, 2008.

2008 D. Tong, A.T. Murray, T.H. Grubesic and S. Dall'erba. "Coverage optimization for deploying an wireless mesh network." *International Symposium on Locational Decisions (ISOLDE) XI*, Santa Barbara, California, USA, June 26 - July 1, 2008.

2008 A.T. Murray, J. Corcoran and R.J. Stimson. "Estimating employment growth under commute minimization scenarios." *2008 Annual Meeting of the Association of American Geographers*, Boston, Massachusetts, USA, April 15-19, 2008.

2008 J. Olson, A.T. Murray and K. Kim. "Radar location: exploring coverage modeling issues." *2008 Annual Meeting of the Association of American Geographers*, Boston, Massachusetts, USA, April 15-19, 2008.

2008 T.C. Matisziw, A.T. Murray and T.H. Grubesic. "Strategic infrastructure restoration." *2008 Annual Meeting of the Association of American Geographers*, Boston, Massachusetts, USA, April 15-19, 2008.

2008 H.-S. Cha and A.T. Murray. "Public transit service equity and spatial representation." *2008 Annual Meeting of the Association of American Geographers*, Boston, Massachusetts, USA, April 15-19, 2008.

2008 D. Tong, A.T. Murray and N. Xiao. "Heuristics in facility location: a genetic algorithm for coverage maximization." *Western Regional Science Association 47th Annual Meeting*, Hawaii, USA, February 17-20, 2008.

2008 T.H. Grubesic and A.T. Murray. "Spatial equity in exposure to risk: sex offender residency." *Western Regional Science Association 47th Annual Meeting*, Hawaii, USA, February 17-20, 2008.

2007 A.T. Murray. "Extending the boundaries with location analysis and GIScience." *54th North American Regional Science Association International*, Savannah, Georgia, USA, November 7-10, 2007.

2007 T.H. Grubesic and A.T. Murray. "Spatial dispersion of convicted sex offenders." *54th North American Regional Science Association International*, Savannah, Georgia, USA, November 7-10, 2007.

2007 T.C. Matisziw, A.T. Murray and T.H. Grubesic. "Network vulnerability analysis: implications for planning and policy." *54th North American Regional Science Association International*, Savannah, Georgia, USA, November 7-10, 2007.

2007 J. Olson and A.T. Murray. "Continental scale radar siting." *54th North American Regional Science Association International*, Savannah, Georgia, USA, November 7-10, 2007.

2007 D. Tong, A.T. Murray and N. Xiao. "Incorporating spatial information for solving a coverage maximization siting problem." *54th North American Regional Science Association International*, Savannah, Georgia, USA, November 7-10, 2007.

2007 X. Wu, A.T. Murray and N. Xiao. "Optimizing relative contiguity in reserve design." *54th North American Regional Science Association International*, Savannah, Georgia, USA, November 7-10, 2007.

2007 A.A. Iqbal and A.T. Murray. "Locating emergency warning sirens: a new approach." *Association of Collegiate Schools of Planning 48th Annual Conference*. Milwaukee, Wisconsin, USA, October 18-21, 2007.

2007 A.T. Murray, T.C. Matisziw, D. Tong, H. Wei. "GeoComputational approaches to coverage maximization in service facility siting." *GeoComputation 2007*, Kildare, Ireland, September 3-5, 2007.

2007 K. Kim and A.T. Murray. "Spatial representation issues in surveillance sensor location modeling." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 D.E. Snediker, A.T. Murray and T.C. Matisziw. "Decision support for network management." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 J.N. Mefford and A.T. Murray. "Discrete choice and spatial analysis of travelers' responsiveness to urban land use and transportation system change." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 H. Wei, R.C. Tiwari and A.T. Murray. "A spatial semiparametric Bayesian model for predicting cancer mortality rates." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 G. Lee and A. Murray. "Municipal wireless broadband network design: facility location-network design approach." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 D. Tong and A.T. Murray. "Addressing region-wide coverage issues." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 T.C. Matisziw and A.T. Murray. "Assessing nature reserve vulnerability." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 J. Olson and A.T. Murray. "Large scale set covering." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 E. Delmelle and A. Murray. "Spatial sampling and location modeling." *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21 2007.

2007 T.H. Grubesic, A.T. Murray and E.A. Mack. "Geographic exclusion: spatial analysis for evaluating the implications of Megan's Law." *Ninth Annual International Crime Mapping Research Conference,* Pittsburgh, Pennsylvania, USA, March 28-31, 2007.

2007 F. Janoos, R. Machiraju, R. Parent, J.W. Davis, A. Murray. "Sensor orientation for coverage optimization for surveillance applications." IS&T/SPIE 19th Annual Symposium on Electronic Imaging, Science and Technology, San Jose, California, USA, January 28 – February 1, 2007.

2007 Matisziw, T.C., A.T. Murray, and T.H. Grubesic. "Evaluating vulnerability and risk in interstate highway operation. *Transportation Research Board 86th Annual Meeting,* Washington, D.C., USA, January 21-25, 2007.

2006 H. Wei and A.T. Murray. "A hierarchical spatial model to explore the effect of West Nile Virus on wild bird population." *53rd North American Meeting of the Regional Science Association International*, Toronto, Ontario, Canada, November 16-18, 2006

2006 D. Tong and A.T. Murray. "Maximizing regional coverage using spatial objects." *53rd North American Meeting of the Regional Science Association International*, Toronto, Ontario, Canada, November 16-18, 2006

2006 T.H. Grubesic, T.C. Matisziw and A.T. Murray. "Comparative approaches for assessing network performance and vulnerability." *53rd North American Meeting of the Regional Science Association International*, Toronto, Ontario, Canada, November 16-18, 2006

2006 T.C. Matisziw and A.T. Murray. "Reducing model complexity in the search for vital network facilities." *53rd North American Meeting of the Regional Science Association International*, Toronto, Ontario, Canada, November 16-18, 2006

2006 K. Kim, A.T. Murray and N. Xiao "A multi-objective evolutionary algorithm for surveillance sensor placement." *53rd North American Meeting of the Regional Science Association International*, Toronto, Ontario, Canada, November 16-18, 2006

2006 M. Goycoolea, J. Vielma, A.T. Murray and A. Weintraub. "Green up and adjacency issues in forest spatial harvesting." *INFORMS Annual Meeting*, Pittsburgh, Pennsylvania, USA, November 5-8, 2006.

2006 M. Goycoolea, J. Vielma, A.T. Murray and A. Weintraub. "Comparing two formulations for the ARM problem." *12th Symposium for Systems Analysis in Forest Resources*, Burlington, Vermont, USA, September 5-8, 2006.

2006 D. Tong and A.T. Murray. "Geographical information science to enhance location coverage modeling." *UCGIS Summer Assembly 2006*, Vancouver, Washington, USA, June 28 - July 1, 2006.

2006 D. Tong and A.T. Murray. "Partial coverage in continuous space facility siting." *102nd Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, March 7-11, 2006.

2006 T.C. Matisziw and A.T. Murray. "The contributions of Professor Charles S. ReVelle." *102nd Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, March 7-11, 2006.

2006 K. Kim and A.T. Murray. "Modeling to support 24/7 security monitoring." *102nd Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, March 7-11, 2006.

2006 J. Mefford, A.T. Murray and T.H. Grubesic. "Multi-objective optimization for identifying vulnerability in critical network infrastructure." *102nd Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, March 7-11, 2006.

2006 X. Wu and A.T. Murray. "Identifying critical network infrastructure: n most vital arc problem." *102nd Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, March 7-11, 2006.

2006 H. Wei A.T. Murray and T.C. Matisziw. "An EM algorithm for inferring OD traffic matrix." *102nd Annual Meeting of the Association of American Geographers*, Chicago, Illinois, USA, March 7-11, 2006.

2006 A.T. Murray and D. Tong. "Analyzing structure fires in Massachusetts: regional science and the media." *45th Annual Meeting of the Western Regional Science Association*, Santa Fe, New Mexico, USA, February 22-26, 2006.

2005 J.P. Vielma, M. Goycoolea, A. Murray and A. Weintraub. "Comparison of methodologies for limiting opening sizes in forest harvest scheduling." *INFORMS Annual Meeting*, San Francisco, California, USA, November 13-16, 2005.

2005 A.T. Murray and K. Kim. "Modeling to support greater integration of surveillance system sensors." *52nd North American Meeting of the Regional Science Association International*, Las Vegas, Nevada, USA, November 10-12, 2005.

2005 A.T. Murray and D. Tong. "Coverage in continuous space facility siting." 52nd *North American Meeting of the Regional Science Association International*, Las Vegas, Nevada, USA, November 10-12, 2005.

2005 A.T. Murray, T.C. Matisziw and T.H. Grubesic. "Simulating impacts of network interdiction on O-D flow activity." 52nd *North American Meeting of the Regional Science Association International*, Las Vegas, Nevada, USA, November 10-12, 2005.

2005 X. Wu, A.T. Murray and N. Xiao. "A hybrid evolutionary algorithm for optimizing spatial contiguity in multiobjective land acquisition." 52nd *North American Meeting of the Regional Science Association International*, Las Vegas, Nevada, USA, November 10-12, 2005.

2005 H. Wei and A.T. Murray. "Bayesian inference for origin-destination matrix estimation." 52nd *North American Meeting of the Regional Science Association International*, Las Vegas, Nevada, USA, November 10-12, 2005.

2005 T. Grubesic, A.T. Murray and J. Mefford. "Continuity in critical network infrastructures: measuring nodal disruptions." 52nd *North American Meeting of the Regional Science Association International*, Las Vegas, Nevada, USA, November 10-12, 2005.

2005 A.T. Murray and D. Tong . "Threshold coverage optimization." *ISOLDE X*, Spain (Sevilla and Islantilla), June 2-9, 2005.

2005 C. ReVelle, A.T. Murray and D. Serra. "Location models for ceding market share and shrinking services." *ISOLDE X*, Spain (Sevilla and Islantilla), June 2-9, 2005.

2005 A.T. Murray, K. Kim, J. Davis, R. Machiraju and R. Parent. "Coverage optimization to support security monitoring."*101st Annual Meeting of the Association of American Geographers*, Denver, Colorado, USA, April 5-9, 2005.

2005 H. Wei, A.T. Murray and N. Xiao. "Solving the continuous space p-center problem: planning application issues."*101st Annual Meeting of the Association of American Geographers*, Denver, Colorado, USA, April 5-9, 2005.

2005 B. Chastain and A.T. Murray. "Spatial structure in harvest scheduling optimization."*101st Annual Meeting of the Association of American Geographers*, Denver, Colorado, USA, April 5-9, 2005.

2005 X. Wu, A.T. Murray and N. Xiao. "Solution approaches for land use planning models addressing spatial contiguity."*101st Annual Meeting of the Association of American Geographers*, Denver, Colorado, USA, April 5-9, 2005.

2005 T.H. Grubesic and A.T. Murray. "Asset concentration and the geographic dimensions of cascading failure." *44th Annual Meeting of the Western Regional Science Association*, San Diego, California, USA, February 23-26, 2005.

2004 T.C. Matisziw and A.T. Murray. "Modeling continuous location and demand in the coverage of non-convex regions." 51*th North American Meeting of the Regional Science Association International*, Seattle, Washington, USA, November 11-13, 2004.

2004 X. Wu and A.T. Murray. "Optimizing spatial contiguity in land use modeling." 51*th North American Meeting of the Regional Science Association International*, Seattle, Washington, USA, November 11-13, 2004.

2004 T.H. Grubesic and A.T. Murray. "Vital nodes, interconnected infrastructures and the geographies of cascading failure." 51*th North American Meeting of the Regional Science Association International*, Seattle, Washington, USA, November 11-13, 2004.

2004 X. Wu and A.T. Murray. "Spatial contiguity in land use planning." *GIScience 2004*, College Park, Maryland, USA, October 20-23, 2004.

2004 C. Wu and A.T. Murray. "Validating population estimates using remote sensing." *American Society for Photogrammetry & Remote Sensing - ASPRS 2004 Annual Conference*, Denver, Colorado, USA, May 23-28, 2004.

2004 A. Weintraub, D. Ryan, J. Vielma and A.T. Murray. "Exact formulation for spatial harvesting problems." *CORS/INFORMS Joint International Meeting*, Banff, Alberta, Canada, May 16-19, 2004.

2004 A.T. Murray. "Coverage modeling of geographic areas." *Centennial Meeting of the Association of American Geographers*, Philadelphia, Pennsylvania, USA, March 14-19, 2004.

2004 W.V. Ackerman and A.T. Murray. "A vector analysis of violent crime in Lima, Ohio." *Centennial Meeting of the Association of American Geographers*, Philadelphia, Pennsylvania, USA, March 14-19, 2004.

2004 T.C. Matisziw and A.T. Murray. "Enhancing species survivability in nature reserve design." *Centennial Meeting of the Association of American Geographers*, Philadelphia, Pennsylvania, USA, March 14-19, 2004.

2004 X. Wu and A.T. Murray. "Quantification of spatial contiguity." *Centennial Meeting of the Association of American Geographers*, Philadelphia, Pennsylvania, USA, March 14-19, 2004.

2003 A.T. Murray and B. Farhan. "Modeling coverage and distance decay." 50th *North American Meeting of the Regional Science Association International*, Philadelphia, Pennsylvania, USA, November 20-22, 2003.

2003 T.H. Grubesic and Alan T. Murray. "Geocoding accuracy and its impact on location modeling and planning: a review of the critical issues." 50th *North American Meeting of the Regional Science Association International*, Philadelphia, Pennsylvania, USA, November 20-22, 2003.

2003 C. Wu and A.T. Murray. "Addressing quality and coverage in transit system management." 50th *North American Meeting of the Regional Science Association International*, Philadelphia, Pennsylvania, USA, November 20-22, 2003.

2003 A. Weintraub, D. Ryan, A. Murray and J.P. Vielma. "Solving a difficult exact formulation of a spatial forestry problem." *Mathematical Programming in Rio, A Conference in Honour of Nelson Maculan*, Buzios, Brasil November 9-12, 2003.

2003 A.T. Murray and C. Wu . "Using GIS to improve transit planning." *Ohio Transportation Engineering Conference*, Columbus, Ohio, USA, November 5-6, 2003.

2003 A.T. Murray and X. Wu. "Assessing landscape contiguity in reserve design." *Symposium for Systems Analysis in Forest Resources*, Stevenson, Washington, USA, October 7-9, 2003.

2003 A.T. Murray, J.P. Vielma, D. Ryan and A. Weintraub. "Improved solution techniques for multi-period area-based harvest scheduling problems." *Symposium for Systems Analysis in Forest Resources*, Stevenson, Washington, USA, October 7-9, 2003.

2003 E. Lobao and A.T. Murray. "Examining spatial inequality within the homeless shelter system in Columbus, Ohio." 66th *Annual Meeting of the Rural Sociological Society*, Montreal, Quebec, Canada, July 27-30, 2003.

2003 A.T. Murray and R.W. Jackson. "Approaches for IO matrix updating." 99th *Annual Meeting of the Association of American Geographers*, New Orleans, Louisiana, USA, March 4-8, 2003.

2003 C. Wu and A.T. Murray. "A cokriging method for estimating population density in urban areas." 99th *Annual Meeting of the Association of American Geographers*, New Orleans, Louisiana, USA, March 4-8, 2003.

2003 B. Farhan and A.T. Murray. "A new approach for locating park and ride facilities." 99th *Annual Meeting of the Association of American Geographers*, New Orleans, Louisiana, USA, March 4-8, 2003.

2003 W.V. Ackerman and A.T. Murray. "Assessing spatial patterns of crime in Lima, Ohio." 99th *Annual Meeting of the Association of American Geographers*, New Orleans, Louisiana, USA, March 4-8, 2003.

2003 T.C. Matisziw, C. Kim and A.T. Murray. "Strategic bus route extension." 99th *Annual Meeting of the Association of American Geographers*, New Orleans, Louisiana, USA, March 4-8, 2003.

2003 B. Farhan and A.T. Murray. "A GIS-based approach for delineating market areas for park-and-ride facilities." *Transportation Research Board 82nd Annual Meeting*, Washington, D.C., USA, January 12-15, 2003.

2002 A.T. Murray and T.H. Grubesic. "Assessing the reliability of crime analysis using imperfect spatial information." *The Sixth International Crime Mapping Research Conference* (National Institute of Justice, Mapping and Analysis for Public Safety program), Denver, Colorado, USA, December 8-11, 2002.

2002 T.H. Grubesic and A.T. Murray. "Imperfect spatial information: implications for crime mapping and analysis." *The Sixth International Crime Mapping Research Conference* (National Institute of Justice, Mapping and Analysis for Public Safety program), Denver, Colorado, USA, December 8-11, 2002.

2002 A.T. Murray, M. Goycoolea and A. Weintraub. "Modeling average and maximum area restrictions in harvest scheduling." *INFORMS*, San Jose, California, USA, November 17-20, 2002.

2002 A.T. Murray and X. Wu. "Supporting public transit service provision planning: access and accessibility concerns." *49th North American Meeting of the Regional Science Association International*, San Juan, Puerto Rico, November 13-16, 2002.

2002 T.H. Grubesic and A.T. Murray. "Broadband internet access and competition in the last-mile." *49th North American Meeting of the Regional Science Association International*, San Juan, Puerto Rico, November 13-16, 2002.

2002 T.C. Matisziw, C. Kim and A.T. Murray. "Strategic service extension in bus-based public transportation systems." *49th North American Meeting of the Regional Science Association International*, San Juan, Puerto Rico, November 13-16, 2002.

2002 M.W. Horner and A.T. Murray. "Rethinking estimates of spatial access to transit service." *49th North American Meeting of the Regional Science Association International*, San Juan, Puerto Rico, November 13-16, 2002.

2002 R.W. Jackson and A.T. Murray. "Alternative matrix updating formulations." *49th North American Meeting of the Regional Science Association International*, San Juan, Puerto Rico, November 13-16, 2002.

2002 B. Farhan and A.T. Murray. "A new approach for locating park-and-ride facilities." *2002 Annual Meeting of the East Lakes Division of the Association of American Geographers*, Central Michigan University, Mt. Pleasant, MI, USA, October 18-19, 2002.

2002 W.V. Ackerman and A.T. Murray. "Assessing spatial patterns of crime in Lima, Ohio." *Ohio Criminal Justice Research Conference*, Columbus, Ohio, USA, October 15, 2002.

2002 R.W. Jackson and A.T. Murray. "Alternate formulations for minimizing inter-matrix distances." *Fourteenth International Conference on Input-Output Techniques*, Montréal, Canada, October 10-15, 2002.

2002 A.T. Murray, M.E. O'Kelly and R.L. Church. "Exploring geometric representation in coverage modeling." *ISOLDE* IX, Fredericton, New Brunswick, Canada, June 12-18, 2002.

2002 A.T. Murray. "Overview of private sector approaches for estimating traffic flow using aerial photography and videography." *North American Travel Monitoring Exhibition and Conference*, Orlando, Florida, USA, May 12-16, 2002.

2002 A.T. Murray and T.H. Grubesic. "Spatial models for crime hot spot detection." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 C. Wu and A.T. Murray. "Estimating population distribution for transit planning using integrated GIS and RS technologies." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 R.W. Jackson and A.T. Murray. "Competition and complementarities in multi-regional economic development." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 X. Wu, K. Jezek and A.T. Murray. "Antarctic ice sheet balance velocities." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 E.G. Lobao and A.T. Murray. "Exploratory spatial data analysis of homeless services in Columbus, Ohio." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 B. Farhan and A.T. Murray. "An approach for delineating park and ride market areas." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 S.K. Thakur, A.T. Murray and R.W. Jackson. "Evaluating the spatial distribution of Research and Development facilities in India." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 H.-S. Cha and A.T. Murray. "Assessing public transit service equity in Columbus, Ohio." *98th Annual Meeting of the Association of American Geographers,* Los Angeles, California, USA, March 19-23, 2002.

2002 M. Goycoolea, A.T. Murray, J. Vielma, F. Barahona, R. Epstein and A. Weintraub. "An exact algorithm for the area restriction model." *Systems Analysis Forestry Symposium Chile 2002*, Punta de Traiea, Chile, March 4-7, 2002.

2001 T.H. Grubesic and A.T. Murray. "Detecting hot-spots using cluster analysis and GIS." *5th Annual International Crime Mapping Research Conference*, Dallas, Texas, USA, November 30 - December 4, 2001.

2001 A.T. Murray. "Addressing access and accessibility in public transit service." *48th North American Meeting of the Regional Science Association International*, Charleston, South Carolina, USA, November 15-17, 2001.

2001 M.W. Horner and A.T. Murray. "Reducing congestion through strategic planning." *48th North American Meeting of the Regional Science Association International*, Charleston, South Carolina, USA, November 15-17, 2001.

2001 M.E. O'Kelly and A.T. Murray. "Geometric models for planar covering with application to warning sirens." *48th North American Meeting of the Regional Science Association International*, Charleston, South Carolina, USA, November 15-17, 2001.

2001 T.H. Grubesic, M.E. O'Kelly and A.T. Murray. "Network reliability and the commercial Internet." *48th North American Meeting of the Regional Science Association International*, Charleston, South Carolina, USA, November 15-17, 2001.

2001 A.T. Murray. "A hybrid coverage model for accessing public transportation service provision." *INFORMS*, Miami, Florida, USA, November 4-7, 2001.

2001 A. Weintraub, M. Goycoolea, A.T. Murray, R. Epstein and F. Barahona. "Solving the adjacency problem constructing the harvesting units." *INFORMS*, Miami, Florida, USA, November 4-7, 2001.

2001 T. Shyy, R.J. Stimson and A.T. Murray. "Internet GIS to benchmark local government socio-economic performance." *7th Pacific Conference of the Regional Science Association International*. Portland, Oregon, USA, June 30 - July 4, 2001.

2001 A. Weintraub, M. Goycoolea, R. Epstein, F. Barahona and A. Murray. "A branch and price approach for a difficult combinatorial problem in spatial forestry." *CORS-OPTD 2001*, Quebec, Canada, May 7-9, 2001.

2001 V. Estivill-Castro, I. Lee and A.T. Murray. "Criteria on proximity graphs for boundary extraction and spatial clustering." *The fifth Asian Pacific Conference on Knowledge Discovery and Data Mining - PAKDD-01*, Hong Kong, China, April 16-18, 2001.

2001 A.T. Murray. "Extending access in public transportation service provision." *97th Annual Meeting of the Association of American Geographers,* New York, New York, USA, February 27 - March 3, 2001.

2001 A.T. Murray. "Spatial pattern detection and scale." *Spatial Statistics and Spatial Econometrics Conference* (sponsored by the Applied Econometrics Association and the Western Regional Science Association), Palm Springs, California, USA, February 24-28, 2001.

2000 V. Estivill-Castro and A.T. Murray. "Clustering and weighted facility location via hybrid optimization." *International ICSC Congress on Intelligent Systems and Applications*, Wollongong, NSW, Australia, December 11-15, 2000.

2000 A.T. Murray and W.V. Ackerman. "Assessing spatial patterns of crime in smaller communities." *4th Annual International Crime Mapping Research Conference,* San Diego, California, USA, December 9-12, 2000.

2000 A.T. Murray. "Suggested locations in space." *47th North American Meeting of the Regional Science Association International*, Chicago, Illinois, USA, November 9-12, 2000.

2000 T.H. Grubesic, A.T. Murray and M.E. O'Kelly. "Constructing the divide: spatial disparities in broadband access." *47th North American Meeting of the Regional Science Association International*, Chicago, Illinois, USA, November 9-12, 2000.

2000 S.K. Thakur, A.T. Murray and R.W. Jackson. "Evaluating the spatial distribution of Research and Development facilities in India." *47th North American Meeting of the Regional Science Association International*, Chicago, Illinois, USA, November 9-12, 2000.

2000 A.T. Murray and M.E. O'Kelly. "Spatial modeling and represented geographic space." *GIScience 2000 - First International Conference on Geographic Information* Science, Savannah, Georgia, USA, October 28-31, 2000.

2000 R. Epstein, M. Goycoolea, A.T. Murray and A. Weintraub. "An adjacency-modeling problem based on constructing harvesting areas." *2000 Symposium on Systems Analysis in Forest Resources*, Aspen, Colorado, USA, September 27-30, 2000.

2000 A.T. Murray and V. Estivill-Castro. "Hybrid optimization for clustering in data mining." *CLAIO 2000*, Mexico City, Mexico, September 4-8, 2000.

2000 A.T. Murray. "Spatially lagged choropleth display." *9th International Symposium on Spatial Data Handling (SDH)*, Beijing, P.R. China, August 10-12, 2000.

2000 D. Ward and R.J. Stimson and A.T. Murray. "A spatial decision support system model for planning real time optimal allocation of regional growth: a case study of the Gold Coast sub-region in South East Queensland." *6th World Congress of the Regional Science Association International*, Lugano, Switzerland, May 16–20, 2000.

2000 A.T. Murray. "Suitable access coverage in the provision of public transportation." *INFORMS*, Salt Lake City, Utah, USA, May 7-10, 2000.

2000 A.T. Murray and A. Weintraub. "Approaches for solving the area restriction model in harvest scheduling." *INFORMS*, Salt Lake City, Utah, USA, May 7-10, 2000.

2000 A.T. Murray. "Exploring crime patterns using quantitative methods." *96th Annual Meeting of the Association of American Geographers*, Pittsburgh, Pennsylvania, USA, April 4-8, 2000.

2000 T. Shyy, R. Davis, R.J. Stimson and A.T. Murray. "An internet geographical information system for revolutionizing access to regional development research." *Western Regional Science Association 39th Annual Meeting*, Kauai, Hawaii, USA, February 26 – March 1, 2000.

1999 A.T. Murray and T. Shyy. "Spatial patterns and choropleth mapping." *46th North American Meeting of the Regional Science Association International,* Montreal, Quebec, Canada, November 11-14, 1999.

1999 A.T. Murray, D.P. Ward, S.R. Phinn and R.J. Stimson. "Urban growth scenario evaluation using an integrated spatial optimization model." *46th North American Meeting of the Regional Science Association International,* Montreal, Quebec, Canada, November 11-14, 1999.

1999 R. Davis, T. Shyy, R.J. Stimson, A.T. Murray and C. Pettit. "Developing an interactive spatial database for decision makers in regional Queensland." *1999 Australia and New Zealand Regional Science Association International Annual Conference*, New Castle, New South Wales, Australia, September 19-22, 1999.

1999 D.P. Ward, A.T. Murray and S.R. Phinn. "Integrating cellular automata and spatial optimization for evaluating rapidly urbanizing regions." *4th International Conference on GeoComputation*, Fredericksburg, Virginia, USA, July 25-28, 1999.

1999 B. Hooper and A.T. Murray. "Social data for catchment management: integrating GIS, demographic and attitudinal surveys for improved catchment decision-making." *International Symposium on Society and Resource Management*, Brisbane, Australia, July 7-10, 1999.

1999 A.T. Murray and R. Davis. "Evaluating equity, fairness and justice concepts in public transport service provision." *95th Annual Meeting of the Association of American Geographers*, Honolulu, Hawaii, USA, March 23-27, 1999.

1999 A.T. Murray. "Public transport access efficiency and coverage." *Western Regional Science Association 38th Annual Meeting*, Ojai, California, USA, February 21-24, 1999.

1998 A.T. Murray. "Cluster analysis in the spatial domain." *45th North American Meeting of the Regional Science Association International,* Santa Fe, New Mexico, USA, November 11-14, 1998.

1998 A.T. Murray, J.S. Western, P. Mullins and I. McGuffog. "Analyzing patterns of regional criminal activity." *GIS/LIS'98,* Fort Worth, Texas, USA, November 10-12, 1998.

1998 R.J. Stimson, R. Davis and A.T. Murray. "Changing economic performance of urban centres in Queensland 1986-1996." *Australia and New Zealand Regional Science Association International 22nd Meeting*, Barossa Valley, South Australia, Australia, September 21-23, 1998.

1998 R. Davis and A.T. Murray. "Equity in public transport service provision." *Australia and New Zealand Regional Science Association International 22nd Meeting*, Barossa Valley, South Australia, Australia, September 21-23, 1998.

1998 A.T. Murray. "Assessing clustering methods for exploratory spatial data analysis." *38th European Regional Science Association Congress*, Vienna, Austria, August 28 – September 1, 1998.

1998 V. Estivill-Castro and A.T. Murray. "Mining spatial data via clustering." *Eighth International Symposium on Spatial Data Handling*, Vancouver, British Colombia, Canada, July 12-15, 1998.

1998 A.T. Murray. "Transport access and environmental sustainability." *International Conference on Modeling Geographical and Environmental Systems with GIS*, Hong Kong, China, June 23-25, 1998.

1998 A.T. Murray. "Forest modeling and spatial optimization." *CORS/INFORMS*, Montreal, Quebec, Canada, April 26-29, 1998.

1998 R. Davis and A.T. Murray. "Quantifying social justice: a transport example." *Social Justice/Social Judgment*, Sydney, New South Wales, Australia, April 25-26, 1998.

1998 V. Estivill-Castro and A.T. Murray. "Discovering associations in spatial data – an efficient medoid based approach." *2nd Pacific-Asia Conference on Knowledge Discovery and Data Mining*, Melbourne, Victoria, Australia, April 15-17, 1998.

1998 A.T. Murray, R. Davis and R.J. Stimson. "Regional development and public transport." *Western Regional Science Association 37th Annual Meeting*, Monterey, California, USA, February 18-22, 1998.

1998 V. Estivill-Castro and A.T. Murray. "Spatial clustering for data mining with genetic algorithms." *Engineering of Intelligent Systems – EIS'98*, Tenerife, Spain, February 11-13, 1998.

1997 A.T. Murray and R. Davis. "Environmental sustainability and urban growth management." *Pacific Regional Science Conference Organisation 15th Meeting/Australia and New Zealand Regional Science Association 21st Meeting*, Wellington, New Zealand, December 8-12, 1997.

1997 A.T. Murray and V. Estivill-Castro. "Spatial data analysis and clustering." *44th North American Meeting of the Regional Science Association International*, Buffalo, New York, USA, November 6-9, 1997.

1997 A.T. Murray. "Urban development: issues in integrated analysis and planning." *Fifth International Workshop on Technological Change and Urban Form – CIB W72/97*, Jakarta, Indonesia, June 18-20, 1997.

1997 A.T. Murray and R.L. Church. "Optimizing the location of harvesting equipment and access roads." *1997 Symposium on Systems Analysis in Forest Resources*, Traverse City, Michigan, USA, May 28-31, 1997.

1997 R.L. Church, K. Barber, M.A. Figueroa and A.T. Murray. "Generating alternatives in forestry modeling." *INFORMS*, San Diego, USA, May 4-7, 1997.

1997 A.T. Murray and R.L. Church. "Forest planning and Steiner tree extensions." *INFORMS*, San Diego, USA, May 4-7, 1997.

1997 A.T. Murray. "Aggregation error minimization in input-output modeling." *Western Regional Science Association 36th Annual Meeting*, Hawaii, USA, February 23-26, 1997.

1997 B. Roberts and A.T. Murray. "Mapping the spatial corporate." *Producer Services in the APEC Region*, Hawaii, USA, February 22-23, 1997.

1996 J.M. Gottsegen and A.T. Murray. "Analyzing the relationships of spatial structure in aggregated data." *GIS/LIS '96*, Denver, Colorado, USA, November 19-21, 1996.

1996 A.T. Murray and J.M. Gottsegen. "Location model solution stability and the use of aggregate data." *Forty-Third North American Meeting of the Regional Science Association International*, Washington D.C., USA, November 14-17, 1996.

1996 R.L. Church, K. Barber and A.T. Murray. "Modeling for desired future conditions in a National Forest." *Society of American Foresters 1996 Convention*, Albuquerque, New Mexico, USA, November 9-13, 1996.

1996 A.T. Murray and J.M. Gottsegen. "Aggregation effects on location modeling." *Australia and New Zealand Regional Science Association 20th Annual Conference*, Canberra, ACT, Australia, September 23-25, 1996.

1996 A.T. Murray, R.L. Church and A. Weintraub. "Locational issues in forest management." *ISOLDE VII*, Edmonton/Jasper, Alberta, Canada, June 25 - July 3, 1996.

1996 A.T. Murray and R.L. Church. "Optimizing harvesting operations: locating towers, skidders and roads." *ISOLDE VII*, Edmonton/Jasper, Alberta, Canada, June 25 - July 3, 1996.

1995 A.T. Murray and R.L. Church. "The *p*-impact problem for locating noxious and obnoxious facilities." *42nd North American Meeting of the Regional Science Association International*, Cincinnati, Ohio, USA, November 9-12, 1995.

1995 A.T. Murray and R.L. Church. "Modeling desired future conditions." *INFORMS National Meeting*, Los Angeles, California, USA, April 23-26, 1995.

1995 A.T. Murray, R.L. Church, M.A. Figueroa and K. Barber. "A hierarchical land use planning approach for the USDA Forest Service." *INFORMS National Meeting*, Los Angeles, California, USA, April 23-26, 1995.

1994 A.T. Murray and R.L. Church. "Expanding spatial detail and restrictions in public sector location models." *Regional Science Association International 41st North American Meetings*, Niagara Falls, Ontario, Canada, November 17-20, 1994.

1994 A.T. Murray, R.L. Church, M.A. Figueroa, A. Ager and R.J. McGaughey. "Artificial landscape visualization of ecosystem management plans." *Decision Support - 2001*, Toronto, Ontario, Canada, September 12-16, 1994.

1994 R.L. Church, A.T. Murray and K. Barber. "Designing a hierarchical planning model for USDA Forest Service planning." *Sixth Symposium on Systems Analysis and Management Decisions in Forestry*, Pacific Grove, California, USA, September 6-9, 1994.

1994 A.T. Murray, R.L. Church and M.A. Figueroa. "Developing a spatial decision support system for land use management." *TIMS/ORSA Joint National Meeting*, Boston, Massachusetts, USA, April 24-27, 1994.

1994 A.T. Murray, R.L. Church and M.A. Figueroa. "Designing a spatial decision support system for forest ecosystem management." *GIS'94 Eight Annual Symposium on Geographic Information Systems*, Vancouver, British Columbia, Canada, February 21-24, 1994.

1993 A.T. Murray and R.L. Church. "Simulated annealing as a solution methodology for location models." *Regional Science Association International Fortieth North American Meetings*, Houston, Texas, USA, November 11-14, 1993.

1993 A.T. Murray and R.L. Church. "Heuristic approaches for solving area-based forest planning problems." *ORSA/TIMS Joint National Meeting*, Phoenix, Arizona, USA, October 31 - November 3, 1993.

1993 A.T. Murray and R.L. Church. "Adjacency constraint aggregation." *International Symposium on Systems Analysis and Management Decisions in Forestry*, Valdivia, Chile, March 9-12, 1993.

1992 A.T. Murray and R.L. Church. "Vehicle availability and estimating service coverage." *Regional Science Association International Thirty-Ninth North American Meetings*, Chicago, Illinois, USA, November 13-15, 1992.

1992 A.T. Murray and R.L. Church. "The reliability of α-reliability." *ORSA/TIMS Joint National Meeting*, San Francisco, California, USA, November 1-4, 1992.

1992 R.L. Church, A.T. Murray and S.R. Loban. "Forest planning and management using large scale linear programming." *ORSA/TIMS Joint National Meeting*, San Francisco, California, USA, November 1-4, 1992.

1991 A.T. Murray and R.L. Church. "Modeling school utilization and consolidation." *Thirty-Eighth North American Meetings of the Regional Science Association International*, New Orleans, Louisiana, USA, November 7-10, 1991.

Invited Lectures

2022 School of Public Policy, University of California at Riverside. "Geospatial sciences to support urban, economic, social and environmental planning and policy." April 25, 2022.

2021 A.T. Murray. "International Regional Science Review Trends." *68th North American Meetings of the Regional Science Association International*, Denver, Colorado, USA, November 10-13, 2021.

2020 R.L. Church and A.T. Murray. "Alonso Book Award Session: Location covering models." *67th North American Meetings of the Regional Science Association International*, November 9-13, 2020.

2020 Department of Geography, University of Utah, USA. "Extreme weather vulnerability risk and response". February 7, 2020.

2019 *Global Economy and Finance Re-start Conference*, Nanjing, China. "Economic and financial impacts of wildfire and floods" (**野火和洪水**对经济和金融的影响). November 9-10, 2019.

2019 *Understanding Extreme Fire Weather Hazards and Improving Resilience in Coastal Santa Barbara Workshop*, University of California at Santa Barbara, Santa Barbara, California, USA. "Risk, warning and evacuation". October 24, 2019.

2019 *Machine Learning and Famine Early Warning Workshop*, Climate Hazards Center, University of California at Santa Barbara, Santa Barbara, California, USA. "Machine learning from a spatial perspective". October 16, 2019.

2019 Department of Industrial Engineering, University of Naples Federico II, Italy. "Spatial optimization for addressing vulnerability issues". June 26, 2019.

2019 College of Surveying and Geo-Informatics, Tongji University, China. "Spatial data analytics revolution" (**空**间数据分析革命). June 2, 2019.

2019 School of Geographic Sciences, East China Normal University, China. "Addressing vulnerability through spatial data science" (**通过空间数据科学解决脆弱性**问题). May 30, 2019.

2019 *The New Data Revolution in Regional Science,* The Regional Science Academy, Tel Aviv, Israel. "Regional science publication trends." April 10-11, 2019.

2019 Spatial Analysis and Modeling Plenary, Spatial Analysis and Modeling Specialty Group of the Association of American Geographers (plenary), *2019 Annual Meeting of the American Association of Geographers*, Washington D.C., USA. "Spatial analysis and modeling: analytics and spatial data science." April 3-7, 2019.

2019 California Center for Population Research, University of California at Los Angeles, USA. "Population vulnerability and spatial analytics." March 13, 2019.

2019 Department of Geography, Seoul National University, South Korea. "Spatial data science analytics" (공간 데이터 과학 분석). January 17, 2019.

2018 *65th North American Meetings of the Regional Science Association International (The Regional Science Academy, Special Academic Session)*, San Antonio, Texas, USA. "To cover or not to cover." November 7-10, 2018.

2018 *I/UCRC Spatiotemporal Innovation Center: 2018 Technical Training Course of National Geographic Conditions Monitoring and Analysis*, University of California at Santa Barbara, Santa Barbara, California, USA. "Spatial variability of retail gasoline price in Santa Barbara." October 23-24, 2018 (with J. Xu).

2018 *I/UCRC Spatiotemporal Innovation Center: 2018 Technical Training Course of National Geographic Conditions Monitoring and Analysis*, University of California at Santa

Barbara, Santa Barbara, California, USA. "Spatial analytics for the evaluation and enhancement of public street lighting service." October 23-24, 2018 (with X. Feng).

2018 *International Conference on Spatial Analysis and Modeling* (keynote), Tokyo, Japan. "Spatial analysis and modeling evolution" (**空間解析とモデリングの進化**). September 8-9, 2018.

2018 School of Earth and Environmental Sciences, University of Queensland, Australia. " The rise (or return) of spatial optimization." August 23, 2018.

2018 National Institute for Applied Statistics Research Australia, University of Wollongong, Australia. " Observed spatial clustering." August 22, 2018.

2018 School of Earth Sciences and Engineering, Hohai University, China. "GIS时代的中心位置问题". June 10, 2018.

2018 School of Geographic and Oceanographic Sciences, Nanjing University, China. "Questions of central location in an era of GIS". June 10, 2018.

2018 *7th International Workshop on Regional, Urban, and Spatial Economics in China* (keynote), Changsha, Hunan, China. "Regional analysis in a rural world" (农村地区的区域分析). June 8-9, 2018.

2018 Distinguished Lecture Series in Remote Sensing and GIScience, Peking University, China. "The significance of GIS and spatial optimization" (GIS**的意**义和空间优**化**). June 6, 2018.

2017 Center for Spatial Information Science / Housing and Urban Analysis Lab, Department of Urban Engineering, University of Tokyo and Department of Logistics and Information Engineering, Tokyo University of Marine Science and Technology, Japan. "Information engineering and optimization in system sustainability planning" (**持続可能なシステムのための都市オペレーション研究**). December 12, 2017.

2017 *Workshop on Urban Operations Research* (keynote), Nanzan University, Japan. "Urban operations research for sustainable systems" (**システム・サステナビリティ計画における情報工学と最適化**). December 9-10, 2017.

2017 Department of Information Systems and Mathematical Sciences, Nanzan University, Japan. "Spatial optimization in commercial GIS" (**商業GISにおける空間最適化**). December 8, 2017.

2017 *I/UCRC Spatiotemporal Innovation Center: 2017 Training Workshop*, University of California at Santa Barbara, Santa Barbara, California, USA. "Providing effective spatio-temporal fire service." November 6-8, 2017.

2017 *Western Regional Science Association 56th Annual Meeting* (presidential address), Santa Fe, New Mexico, USA. "Analytics and regional science." February 15-18, 2017.

2016 *International Symposium on National Geographic State Monitoring* (keynote), "Data, modeling and analytics for urban-regional sustainability" (**城市区域可持**续发展的数据，建模和分). Wuhan, China, December 17-18, 2016.

2016 Jiangxi University of Finance & Economics, China. "Spatial analytics in urban-regional development" (**城市区域**发展中的空间分析).

2016 GeoMundus (keynote), *8th International Symposium on Geography, Earth and Environmental Studies*. "Why you should care about advanced spatial analytics." Castellon de la Plana, Spain, November 4-5, 2016.

2016 SOCHER (keynote), *Meeting of the Sociedad Chilena de Estudios Regionales*, "The role of data, modeling and analysis in reshaping regions and cities." Santiago, Chile, September 8-10, 2016.

2016 Departamento de Ingenieria Industrial, Universidad de Chile, Chile. "Facility location optimization advances through spatial knowledge."

2016 Harbin Normal University, China. "Geospatial challenges in analytical definitions of a center."

2016 Peking University, China. "Location and spatial analytics in contemporary planning and decision making environments."

2016 Center for Spatial Studies, University of California at Santa Barbara, USA. "Identifying the center of a spatial object."

2015 Department of Geography, UC Libraries and IT@UC, University of Cincinnati, USA. "Applying GIS to contemporary issues."

2015 School of Social Sciences, Monash University, Australia. "Spatial analytics: past, present and future."

2015 Department of Industrial & Systems Engineering, Lehigh University, USA. "Spatial optimization: evolving analytics, knowledge and theory."

2015 Department of Geography, University of California at Santa Barbara, USA. "Advancing spatial analytics to address urban, economic, social and environmental issues."

2015 School of Geography, Earth and Environmental Sciences, University of Birmingham, UK. "Evolving spatial analytics to support geographical inquiry."

2014 Department of Geography (Getis Lecture in Spatial Analysis), San Diego State University, USA. "Evolution of spatial analytics and geocomputation."

2014 College of Business, University of Kent, UK. "Spatial analytics to support wayfinding and routing in complex urban environments."

2014 College of Computing and Informatics, Drexel University, USA. "GeoComputation and spatial analytics to support planning and decision making."

2014 Department of Geography, University of Utah, USA. "GeoComputation to support valid and meaningful GIScience analysis."

2013 Centre for GeoInformatics, University of St Andrews, Scotland, UK. "Spatial optimization to support navigation of complex environments."

2013 College of Computing and Informatics, Drexel University, USA. "Spatial analytics for navigating complex environments."

2013 Department of Geography, University of California at Santa Barbara, USA. "GIScience advances for navigating complex environments."

2012 Department of Planning and Regional Development, University of Thessaly, Greece. "Επέκταση της παροχής υπηρεσιών αστικών πυροσβεστικών σταθμών: χωρική ανάλυση και χρήση GIS και εφαρμογή."

2012 Department of City and Regional Planning, Cornell University, USA. "Land use planning and spatial data uncertainty."

2012 Department of Geography, University of Hawaii, Manoa, USA. "Addressing spatial data uncertainty in land use planning."

2011 Department of Geography & Earth Sciences, University of North Carolina at Charlotte, USA. "The use of GIS in addressing important contemporary planning problems."

2011 iSchool, Drexel University, USA. "GIS and spatial analysis application challenges in addressing contemporary problems and issues."

2010 Department of Geography, University of Texas, USA. "Sex offender residency change behavior."

2010 School of Computing, Informatics, and Decision Systems Engineering, Decision Systems Seminar Series, Arizona State University, USA. "Network infrastructure fortification."

2010 Center for Population Dynamics, Arizona State University, USA. "Exploratory spatial data analysis of housing movement patterns."

2009 Department of Industrial and Systems Engineering, Texas A&M University, USA. "Geographic information systems (GIS) relevance in optimization."

2008 Department of Geography and Regional Development, University of Arizona, USA. "Sex offender exclusion laws: spatial analytical methods to support policy evaluation and formulation."

2008 School of Geographical Sciences, Arizona State University, USA. "Location modeling and GIScience".

2007 Criminal Justice Research Center and the Institute for Excellence in Justice, The Ohio State University, USA. "Evaluating sex offender exclusion laws."

2007 Initiative in Population Research, The Ohio State University, USA. "Geographic Information Systems (GIS): Introduction and Use in Population Research" (with N. Xiao).

2005 Department of Geography, San Diego State University, USA. "Spatial representation and location coverage optimization."

2005 Department of Geology and Geography, West Virginia University, USA. "The importance of spatial representation in emergency service planning."

2004 Department of Geography, University of Connecticut, USA. "A new perspective for coverage modeling."

2004 Department of Geography, University of Cincinnati, USA. "Rethinking coverage modeling in siting emergency warning sirens."

2004 Department of City and Regional Planning, The Ohio State University, USA. "Emergency warning siren coverage: planning and analysis."

2004 Department of Geography, University of California at Los Angeles, USA. "GIST in modeling spatial coverage."

2003 Center for Urban and Regional Analysis, The Ohio State University, USA. "Examining forecasted population growth by integrating regional modeling and local simulation."

2003 Criminal Justice Research Center and Center for Urban and Regional Analysis, The Ohio State University, USA. "Imperfect spatial information and the analysis of crime."

2002 Regional Research Institute, West Virginia University, USA. "Geographical considerations in forest management planning."

2002 Departamento de Ingenieria Industrial, Universidad de Chile, Chile. "Exploring alternative interpretations of maximum area restrictions in harvest scheduling."

2001 Bio-Complexity Workshop, Center for Mapping, The Ohio State University, USA. "Spatial modeling for evaluating urban growth."

2001 Departamento de Ingenieria Industrial, Universidad de Chile, Chile. "The importance of modeling to support forest planning and decision making."

2000 Institute of Remote Sensing Applications, Chinese Academy of Sciences, China. "Potential remote sensing applications in public transportation planning."

1999 Department of Geography, State University of New York at Buffalo, USA. "GIS based approaches for identifying patterns of suburban crime."

1999 Department of Geography, Ohio State University, USA. "Using GIS and spatial analysis for evaluating and planning public transportation."

1999 Department of Geography and Center for the Study of Institutions, Population, and Environmental Change, Indiana University, USA. "Evaluating sustainability issues using GIS and spatial analysis."

1999 Departamento de Ingenieria Industrial, Universidad de Chile, Chile. "Mathematical considerations for imposing spatial restrictions in harvest scheduling problems."

1998 Department of Earth and Atmospheric Sciences, University of Alberta, Canada. "Regional public transportation service access."

1998 Department of Earth and Atmospheric Sciences, University of Alberta, Canada. "Spatially restricted forest harvest scheduling."

1998 Department of Geography, University of Utah, USA. "Regional public transportation service access."

1998 Department of Geography, University of Kentucky, USA. "Regional public transportation service access."

1998 Department of Geography, University of Kentucky, USA. "GIS, spatial analysis and forest management."

1998 Department of Anthropology and Sociology, University of Queensland, Australia. "What every sociologist should know about geographical information systems."

1998 SEQ 2001, Queensland Government, Australia. "Modelling access to services and facilities."

1998 Department of Geography, Southern Illinois University, USA. "The use of GIS in natural resource management."

1998 Department of Systems and Industrial Engineering, University of Arizona, USA. "Location models for improving public transport services."

1997 Department of Geography, University of Florida, USA. "Systems analysis in forest management planning."

1997 Australian Housing and Urban Research Institute, Queensland University of Technology, Australia. "Systems analysis in environmental management planning."

1997 School of Forest Resources, University of Georgia, USA. "Analysis and modeling in forest resource management."

1997 Department of Geographical Sciences and Planning, University of Queensland, Australia. "Natural resource management."

1997 Forest Research Institute, Rotorua, New Zealand. "Harvest scheduling and spatial restrictions."

1996 CSIRO - Division of Building, Construction and Engineering, Australia. "Modelling impact in undesirable facility location."

1996 Department of Geography, University of Iowa, USA. "Data issues in medical geography: boundaries and aggregation."

1996 Department of Geography, University of Iowa, USA. "Land management and policy assessment using integrated optimization."

1996 Department of Geography and GISCA, University of Adelaide, Australia. "SDSS and GIS development for integrated analysis and planning."

1996 AHURI/CSIRO Knowledge Exchange Seminar, Mallacoota, Victoria, Australia. "GIS and SDSS for sustainable urban and regional planning."

1995 Department of Forest Science, Texas A&M University, USA. "Applying heuristic solution techniques to operational forest planning problems."

1995 Departamento de Ingenieria Industrial, Universidad de Chile, Chile. "Development and application of heuristics for spatial optimization: location and land management" (with R.L. Church).

1995 Department of Geography, University of California, Santa Barbara, USA. "Applying heuristic solution approaches to operational forest planning problems."

Expert Testimony

John Doe vs. Jim Petro et al. (2005); United States District Court

Professional Service

1. Editorial Activities

(i) Journal Boards and Editorships (see above)
(ii) Edited Journal Special Issues (see above)
(iii) Panelist

"Editors Panel Discussion: How to Publish in International Journals", *Western Regional Science Association 60th Annual Meeting*, February 22-25, 2021.

"The future of regional and urban economics in China and the world", *The 8th RUSE (Regional, Urban, and Spatial Economics in China) International Workshop*, Shanghai, China, May 31-June 1, 2019.

"A Globe-Shaped Crystal Ball: The Next Fifty Years of Geographical Analysis", *2018 Annual Meeting of the Association of American Geographers,* New Orleans, Louisiana, USA, April 10-14, 2018.

"Special Session to Honor Manfred M. Fischer's Contributions to Geography: Spatial Analysis and Modeling 2", *104th Annual Meeting of the Association of American Geographers*, Boston, Massachusetts, USA, April 15-19, 2008.

"Honoring Atsuyuki Okabe: Applications, Developments, and Future Research on Spatial Analysis and GIScience 1", *103rd Annual Meeting of the Association of American Geographers*, San Francisco, California, USA, April 17-21, 2007.

"Meet the Journal Editors II", *Centennial Meeting of the Association of American Geographers*, Philadelphia, Pennsylvania, USA, March 14-19, 2004.

(iv) Book Proposal Reviewer

W.H. Freeman and Company (2000)
Springer (2007)

(v) Journal Reviewer (162 different journals)

4OR - A Quarterly Journal of Operations Research
ACM Transactions on Spatial Algorithms and Systems
Advances in Data Analysis and Classification
Annals, Association of American Geographers
Annals of Operations Research
Annals of Regional Science
Applied Geography
Applied Mathematical Modelling
Applied Soft Computing
Applied Spatial Analysis and Policy
Arabian Journal of Chemistry
Asia-Pacific Journal of Operational Research
Asia-Pacific Journal of Regional Science
Australasian Journal of Regional Studies
Automation in Construction
BMC Public Health
Biodiversity and Conservation
Biosafety and Health
Canadian Journal of Criminology and Criminal Justice
Canadian Journal of Earth Systems
Canadian Journal of Forest Research
Cartographica
Cartography and Geographic Information Science
Case Studies on Transport Policy
Chemical Engineering Science
Cities
Conflict Management and Peace Science
Computational and Applied Mathematics
Computational Optimization and Applications
Computational Statistics and Data Analysis
Computer-Aided Civil and Infrastructure Engineering
Computers & Geosciences
Computers & Operations Research
Computers, Environment and Urban Systems
Crime, Law and Social Change
Crime Mapping: A Journal of Research and Practice
Decision Support Systems
Defence & Peace Economics

Discrete Optimization
Earth Interactions
Ecological Applications
Ecological Informatics
Economic Systems Research
Electronics and Telecommunications Research Institute Journal
Energy Strategy Reviews
Environment and Planning A
Environment and Planning B: Urban Analytics and City Science
Environment and Planning C: Government and Policy
Environmental Engineering Science
Environmental Science & Technology
European Journal of Operational Research
Expert Systems with Applications
Forest Policy and Economics
Forest Science
Geografiska Annaler B: Human Geography
Geographical Analysis
Geographical Journal
Geographical and Environmental Modelling
Geography Compass
GeoJournal
Geoscience and Remote Sensing Letters
Geo-spatial Information Science
Global Food Security
Health and Place
IEEE Access
IEEE Transactions on Intelligent Transportation Systems
INFOR
INFORMS Journal on Computing
ISPRS Journal of Photogrammetry and Remote Sensing
International Forestry Review
International Journal of Critical Infrastructure Protection
International Journal of Digital Earth
International Journal of Environmental Research and Public Health
International Journal of Geographical Information Science
International Journal of Health Geographics
International Journal of Critical Infrastructure Protection
International Journal of Mathematical and Computational Forestry and Natural-Resource Sciences
International Journal of Production Economics
International Journal of Remote Sensing
International Journal of Sustainable Transportation
International Journal of Systems Science
International Transactions in Operational Research
Journal of Advanced Transportation
Journal of Asian Architecture and Building Engineering
Journal of Cleaner Production
Journal of Environmental Management
Journal of Forest Research
Journal of Geographical Systems
Journal of Hydrology
Journal of Infrastructure Systems
Journal of King Saud University - Science
Journal of Parallel and Distributed Computing
Journal of Regional Science
Journal of Spatial Science
Journal of Sustainable Transportation
Journal of the Operational Research Society
Journal of the Operations Research Society of Japan
Journal of Transport Geography
Journal of Water Resources Planning and Management
Journal of Urban Technology
Journal of Urbanism
Justice Quarterly
Land Use Policy
Landscape Ecology
Landscape and Urban Planning
Location Science
LEUKOS

Manufacturing and Service Operations Management
Natural Resource Modeling
Naval Research Logistics
Networks
Networks and Spatial Economics
Omega, The International Journal of Management Science
Operational Research
Operations Research
Optics and Laser Technology
OR Spectrum
Papers in Regional Science
Photogrammetric Engineering and Remote Sensing
Physica A
Physics and Chemistry of the Earth
PLOS ONE
Planning Practice and Research
Population Research and Policy Review
Preventing Chronic Disease
Professional Geographer
Proceedings of the National Academy of Sciences of the United State of America
Reliability Engineering and System Safety
Remote Sensing
Review of Regional Studies
Risk Analysis
Safety and Health at Work
SAGE Open
Social and Cultural Geography
Social Psychological and Personality Science
Social Science Journal
Socio-Economic Planning Sciences
Southern Journal of Applied Forestry
Spatial Cognition and Computation: An Interdisciplinary Journal
Spatial Economic Analysis
Spatial Statistics
Stat
Sustainable Cities and Society
Swarm and Evolutionary Computation
Technology | Architecture + Design
The Geographical Journal
The Southwestern Geographer
TOP
Transportation
Transportation Letters: the International Journal of Transportation Research
Transactions in GIS
Transactions of the Institute of British Geographers
Transactions on Spatial Algorithms and Systems
Transportation Research A: Policy and Practice
Transportation Research C: Transport and Environment
Transportation Research Record
Travel Behaviour and Society
Transportation Science
Urban Climate
Urban Geography
Visual Computing for Industry, Biomedicine, and Art
Water Resources Management

2. Grant Review Panel

National Institutes of Health (2009)
National Science Foundation (2004-2005, 2009, 2019)

3. Grant Proposal Assessor

AgreenSkills (EU)
Australian Research Council
Czech Science Foundation
Criminology Research Council

Critical Infrastructure Resilience Institute (University of Illinois / US Department of Homeland Security)
Eidgenossische Technische Hochschule Zurich (Swiss Federal Institute of Technology Zurich) - Competence Center Environment and Sustainability
European Research Council
Israel Science Foundation
Medical Research Council
National Center of Science and Technology Evaluation (Kazakhstan)
National Commission for Scientific and Technological Development (CONICYT) / Superior Council of the National Fund for Scientific & Technological Development (FONDECYT) (Chile)
National Institutes of Health
National Institute of Justice
National Science Center (Poland)
National Science Foundation
Natural Sciences and Engineering Research Council of Canada
Netherlands Organisation for Scientific Research
Qatar National Research Fund
Research Grants Council of Hong Kong
Regional Research Institute (West Virginia University)
Royal Society (UK)
Science Fund of the Republic of Serbia
U.S. Census Bureau
U.S. Department of Homeland Security / Science & Technology Critical Infrastructure Resilience Center of Excellence

4. External Promotion and Tenure Review

Arizona State University
Boston University
Brigham Young University
Dartmouth College
George Mason University
Griffith University
Indiana University - Purdue University
Louisiana State University
McMaster University
National Cheng Kung University
Northeastern University
Seoul National University
State University of New York, Buffalo
Temple University
Universiti Sains Malaysia
University of California, Riverside
University of Cincinnati
University of Colorado
University of Denver
University of Georgia
University of Hong Kong
University of Illinois, Urbana-Champaign
University of Kent
University of Louisville
University of Maryland
University of Miami
University of Minnesota
University of Nevada, Reno
University of North Carolina, Charlotte
University of Queensland
University of Tennessee
University of Texas, Dallas
University of Toronto

5. External Program Review

2018 Department of Earth & Environment, College of Arts & Sciences, Boston University

6. Advisory Panels

2008-2014 GeoDA Center for Geospatial Analysis and Computation, Arizona State University (oversight committee member)

2005-2008 Initiative in Population Research, The Ohio State University (executive committee member)

2005-2008 Regents Advisory Committee on the Urban University Program, Ohio Board of Regents

2005-2008 Community Research Partners System Policy Group

2004-2005 Center for Urban and Regional Analysis, The Ohio State University (oversight and advisory committee member)

7. Professional Society Service

(i) Boards

2005-2015 Western Regional Science Association, Board of Directors

(ii) Offices

2017-2018 President, Western Regional Science Association

2015-2016 Vice President, Western Regional Science Association

2014-2015 Vice President, Section on Location Analysis, INFORMS

2012-2013 Secretary, Section on Location Analysis, INFORMS

2011-2012 Treasurer, Section on Location Analysis, INFORMS

2009-2011 Councilor-at-Large, North American Regional Science Council

2000-2003 Chair, Spatial Analysis and Modeling Specialty Group of the Association of American Geographers

1999-2000 Newsletter Editor, Mathematical Models and Quantitative Methods Specialty Group of the Association of American Geographers

(iii) Committees

2022-2025 Honors Committee (Regional Science Association International)

2020-2022 Steering committee member, Research Activities Panel (Channel Islands National Marine Sanctuary, National Oceanic and Atmospheric Administration, US Department of Commerce)

2018-2022 Committee member, Tiebout Prize (Western Regional Science Association) (Chair, 2019-2020)

2017 Committee member, ReVelle Rising Star Award Committee (Section on Location Analysis, INFORMS)

2015 Committee member, North American Regional Science Council, Graduate Paper Award

2013 Committee member, North American Regional Science Council, Graduate Student Led Paper Competition

2011 Chair, SOLA-Air Products Dissertation Committee (Section on Location Analysis, INFORMS)

2010 Committee member, INFORMS, Energy and Natural Resources and the Environment Section Student Paper Competition

2005 Chair, UPS-SOLA Dissertation Committee (Section on Location Analysis, INFORMS)

2003 UPS-SOLA Dissertation Committee (Section on Location Analysis. INFORMS)

2003-2006 Census Advisory Committee, Association of American Geographers (Chair, 2006)

2002-2005 Standards for Geographic Data Committee, Association of American Geographers

(iv) International Conference Organization

2022 Western Regional Science Association 61st Annual Meeting (Program Committee). Scottsdale, Arizona, USA, February 17-20, 2022.

2021 GIScience 2021: 11th International Conference on Geographic Information Science (Program Committee), Poznan, Poland, September 27-30, 2021.

2021 ISOLDE (Program Committee), Hamburg and Timmendorfer Strand, Germany, June 13-18, 2021.

2021 Western Regional Science Association 60th Annual Meeting (Program Committee). February 22-25, 2021.

2019 The 8th RUSE (Regional, Urban, and Spatial Economics in China) International Workshop (Scientific Committee), Shanghai, China, May 31-June 1, 2019.

2019 Western Regional Science Association 58th Annual Meeting (Program Committee). Napa, California, USA, February 10–13, 2019.

2018 International Conference on Spatial Analysis and Modeling (Organizing Committee), Tokyo, Japan September 8-9, 2018.

2018 GIScience 2018: Tenth International Conference on Geographic Information Science (Program Committee), Melbourne Australia, August 28-31, 2018.

2018 The 7th International Workshop on Regional, Urban, and Spatial Economics in China (Scientific Committee), Changsha, Hunan, China, June 8-9, 2018.

2017 ISOLDE (Scientific Committee), Toronto and Huntsville, Ontario, Canada, July 10-14, 2017.

2016 GIScience 2016: Ninth International Conference on Geographic Information Science (Program Committee), Montreal, Canada, September 27-30, 2016.

2016 EURO Working Group on Locational Analysis XXIII (Scientific Committee), Malaga, Spain, September 14-16, 2016

2015 13th International Conference on GeoComputation (GeoComputation 2015) (Scientific Advisory Board), Richardson, Texas, USA, May 21-23, 2015.

2015 International Geospatial Health Research Symposium: Creating Synergies (Committee Member), Chicago, Illinois, USA, April 21-25, 2015.

2014 GIScience 2014: Eighth International Conference on Geographic Information Science (Program Committee), Vienna, Austria, September 23-26, 2014.

2014 ISOLDE (Scientific Committee), Naples and Capri, Italy, June 16-21, 2014.

2013 1st International Conference on Geo-Informatics in Green Ecology & Environment (Program Committee), Wuhan, China, November 8-10, 2013.

2013 12th International Conference on GeoComputation (GeoComputation 2013) (Program Committee), Wuhan University, China, May 23-25, 2013.

2012 GIScience 2012 (Program Committee), Columbus, Ohio, USA, September 18-21, 2012.

2011 LAND-TRANSLOG II (Program Committee), Puerto Varas, Chile, December, 12-15, 2011.

2008 ISOLDE (Program Committee), Santa Barbara, California, USA, June 23-28, 2008.

2002 Symposium on Models and Systems in Forestry (with A. Weintraub, R. Haight, M. Bevers, D. Martell and M. Ronnqvist), Punta de Tralca, Chile, March 4-7, 2002.

(v) International Conference Session Organization

2021 The New Data Revolution in Regional Science and the Dilemma of More, and Better Measurement: A Tribute to Stan Czamanski (with D. Broitman, K. Kourtit, D. Czamanski, P. Nijkamp and P. Batey) – 68th North American Meeting of the Regional Science Association International, Denver, Colorado, USA, November 10-13, 2021.

2021 Location and Spatial Analysis sessions (with R. Wei) – 68th North American Meeting of the Regional Science Association International, Denver, Colorado, USA, November 10-13, 2021.

2020 Location and Spatial Analysis sessions (with R. Wei) – 67th North American Meeting of the Regional Science Association International, November 9-13, 2020.

2019 Location and Spatial Analysis sessions (with R. Wei) – 66th North American Meeting of the Regional Science Association International, Pittsburgh, Pennsylvania, USA, November 13-16, 2019.

2018 Location and Spatial Analysis sessions (with R. Wei) – 65th North American Meeting of the Regional Science Association International, San Antonio, Texas, USA, November 7-10, 2018.

2017 Location and Spatial Analysis sessions (with R. Wei) – 64th North American Meeting of the Regional Science Association International, Vancouver, British Columbia, Canada, November 8-11, 2017.

2016 Location and Spatial Analysis sessions (with R. Wei) – 63rd North American Meeting of the Regional Science Association International, Minneapolis, Minnesota, USA, November 9-12, 2016.

2015 Location and Spatial Analysis sessions (with R. Wei) – 62nd North American Meeting of the Regional Science Association International, Portland, Oregon, USA, November 11-14, 2015.

2015 Section on Location Analysis cluster – INFORMS, Philadelphia, Pennsylvania, USA, November 1-4, 2015.

2014 Location and Spatial Analysis sessions (with T. Grubesic) – 61st North American Meeting of the Regional Science Association International, Washington, D.C., USA, November 13-15, 2014.

2014 Section on Location Analysis cluster – INFORMS, San Francisco, California, USA, November 9-12, 2014.

2013 Location and Spatial Analysis: 40 years of Maximal Coverage sessions (with R. Church) – 60th North American Meeting of the Regional Science Association International, Atlanta, Georgia, USA, November 13-16, 2013.

2013 Location and Spatial Analysis sessions (with R. Wei and T. Grubesic) – 60th North American Meeting of the Regional Science Association International, Atlanta, Georgia, USA, November 13-16, 2013.

2013 Optimization, Spatial Analysis and GIS cluster (with R. Church) – INFORMS, Minneapolis, Minneapolis, USA, October 6-9, 2013.

2005 Charles S. ReVelle Sessions in Location Modeling and Spatial Analysis (with T. Matisziw) – 52nd North American Meeting of the Regional Science Association International, Las Vegas, Nevada, USA, November 10-12, 2005.

2004 Location and Spatial Modeling sessions – 51st North American Meetings of the Regional Science Association International, Seattle, Washington, USA, November 11-13, 2004.

2003 Location and Spatial Modeling sessions – 50th North American Meetings of the Regional Science Association International, Philadelphia, Pennsylvania, USA, November 20-22, 2003.

2003 Spatial Analysis and Modeling sessions (sponsored by Spatial Analysis and Modeling specialty group) – 99th Annual Meeting of the Association of American Geographers, New Orleans, Louisiana, USA, March 5-8, 2003.

2002 Location and Spatial Modeling sessions – 49th North American Meetings of the Regional Science Association International, San Juan, Puerto Rico, USA, November 14-17, 2002.

2002 Spatial Analysis and Modeling sessions (sponsored by Spatial Analysis and Modeling specialty group) – 98th Annual Meeting of the Association of American Geographers, Los Angeles, California, USA, March 12-23, 2002.

2001 Location and Spatial Modeling sessions – 48th North American Meetings of the Regional Science Association International, Charleston, South Carolina, USA, November 15-17, 2001.

2001 Spatial Analysis and Modeling, Population Analysis and Modeling, and Plenary Lecture (sponsored by Spatial Analysis and Modeling specialty group) – 97th Annual Meeting of the Association of American Geographers, New York, New York, USA, February 27 – March 3, 2001.

2000 Location Modeling sessions – 47th North American Meetings of the Regional Science Association International, Chicago, Illinois, USA, November 9-12, 2000.

2000 GIS and Modeling in the Analysis of Crime session and Plenary Lecture (sponsored by Mathematical Models and Quantitative Methods specialty group) – 96th Annual Meeting of the Association of American Geographers, Pittsburgh, Pennsylvania, USA, April 4-8, 2000.

1999 Location Modeling sessions – 46th North American Meetings of the Regional Science Association International, Montreal, Quebec, Canada, November 11-14, 1999.

1999 Transportation and Location Modeling session (co-sponsored by Mathematical Models and Quantitative Methods, Transportation Geography and Geographic Information System specialty groups) – 95th Annual Meeting of the Association of American Geographers, Honolulu, Hawaii, USA, March 23-27, 1999.

1998 Location Modeling sessions – 45th North American Meetings of the Regional Science Association International, Santa Fe, New Mexico, USA, November 11-14, 1998.

8. University and Department Committees

University of California at Santa Barbara

Awards and Nominations Committee (chair) – Department of Geography (2021-present)

Space Committee – Department of Geography (2021-present)

Dangermond Student Travel Grants Committee – Department of Geography (2020-present)

Dangermond Chair in Conservation Science Search Committee – University (2019-20)

Committee on Courses and General Education – University (Academic Senate) (2019-20)

Graduate Committee (chair) – Department of Geography (2017-21)

GIS Dangermond Endowed Chair Search Committee – Department of Geography (2019-20)

Spatial Data Science Search Committee (chair) – Department of Geography (2017-18, 2018-19)

UCGIS delegate (2017-present)

Central Recruitment Fellowship Committee – University (Graduate Division) (2016-17)

Web subcommittee (chair) – Department of Geography (2016-18)

Web subcommittee – Department of Geography (2018-19)

Chair's Advisory Committee – Department of Geography (2016-17)

Graduate Core Curriculum – Department of Geography (2016-17)

Strategic and FTE Planning – Department of Geography (2016-17)

Strategic Planning – Department of Geography (2018-19)

Computing & Information Systems – Department of Geography (2016)

Visibility/Outreach/Diversity/Development – Department of Geography (2016)

Curriculum – Department of Geography (2016)

Colloquia – Department of Geography (1994-1995)

Drexel University

Data Science Faculty Search Committee (chair) – Department of Information Science (2015)

Undergraduate Curriculum Committee – Department of Information Science (2015)

Strategic Planning Committee – College of Computing and Informatics (2015)

Finance Committee – College of Computing and Informatics (2015)

Arizona State University

UCGIS representative (2014)

Scholarships/Awards Committee – School of Geographical Sciences and Urban Planning (2014)

Executive Committee – School of Geographical Sciences and Urban Planning (2010-2011)

GIS and Spatial Analysis Faculty Search Committee (chair) – School of Geographical Sciences and Urban Planning (2010, 2011)

Ad hoc Bylaws Committee – School of Geographical Sciences and Urban Planning (2009)

Graduate Studies Committee – School of Geographical Sciences and Urban Planning (2009-2014)

Colloquia Committee (chair) – School of Geographical Sciences and Urban Planning (2008-2014)

The Ohio State University

Senate Government Affairs Committee – University Senate (2007-2008)

Personnel Committee – Department of Geography (2006-2008)

Spatial Analysis and Modeling Faculty Search Committee (chair) – Department of Geography (2005)

GIS Faculty Search Committee – Department of Geography (2004)

College of Social and Behavioral Sciences ad hoc Clinical Faculty Committee (2004)

University Scholar Maximus Competition (2003, 2004)

Office of International Affairs Graduate Student Travel Grants (2002, 2003)

Infrastructure Committee (chair) – Department of Geography (2002-2008)

GIScience Faculty Search Committee – Department of Geography (2002)

Graduate Studies Committee – Department of Geography (2001-2004)

Denman Undergraduate Research Forum (2001, 2002)

Speakers Committee – Department of Geography (1999-2002)

9. Workshops

2015 National Academies of Science, Committee on National Statistics. Rationalizing Rural Area Classifications (sponsored by Economic Research Service, U.S. Department of Agriculture). Washington, D.C., USA. April 16-17, 2015.

2010 Santa Fe Institute. Emergent Properties and Resilience of Interacting Networks. Santa Fe, New Mexico, USA. June 21-23, 2010.

2010 National Research Council. Workshop on New Research Directions for the National Geospatial-Intelligence Agency. Washington, D.C., USA. May 17-19, 2010.

10. Outreach, Extension and Continuing Education

Association for Women in Math (UCSB chapter), February 24, 2021.

Laguna Blanca School (high school), Santa Barbara, California. September 2019-June 2020. Introduced GIS and spatial analysis as part of independent study at this local high school.

Brophy College Preparatory (high school), Phoenix Arizona. September 2011-May 2012. Lectures, workshop and tutorials with teachers and students introducing GIS in mathematics, statistics and science courses at this local high school.

Instructor, Geographical methods in public transit planning (sponsored by United Arab Emirates Department of Transport. Abu Dhabi, United Arab Emirates. April 30 – May 1, 2009. The workshop had approximately 40 attendees.

Instructor, Spatial optimization and GIS (sponsored by Università degli Studi di Milano, University of Milan, and Politecnico of Milan). Milan, Italy. January 29 – February 2, 2007. The seminar had approximately 25 researchers and students.

Instructor, Spatial Perspectives on Analysis for Curriculum Enhancement (SPACE) program through Center for Spatially Integrated Social Science (CSISS) - "GIS & Spatial Modeling for Use in Undergraduate Education." Columbus, Ohio, USA (June 28 - July 2, 2004: July 10-15, 2005; June 18-23, 2006; June 18-23, 2007). SPACE and CSISS are funded by NSF and the workshop had approximately 30 U.S. and international participants each year.

Instructor, Center for Spatially Integrated Social Science (CSISS) Workshop - "Accessibility in Space and Time: A GIS Approach." Columbus, Ohio, USA (July 16-20, 2001; July 22-26, 2002; July 7-11, 2003). CSISS is funded by NSF and the workshops had approximately 30 U.S. and international participants each year.

11. Professional Society Membership

American Association for the Advancement of Science
American Association of Geographers
American Planning Association
Association of Collegiate Schools of Planning
Institute for Operations Research and the Management Sciences
North American Regional Science Association
Regional Science Association International

Society of American Foresters
Western Regional Science Association

EXHIBIT C

IN THE UNITED STATES DISTRICT COURT FOR THE

MIDDLE DISTRICT OF LOUISIANA

PRESS ROBINSON, *et al.*
PLAINTIFFS

C.A. No. 3:22-cv-00211-SDD-RLB

v.

KYLE ARDOIN, in his
official capacity as Secretary
of State for Louisiana
DEFENDANT

EDWARD GALMON, SR., *et al.*
PLAINTIFFS

C.A. No. 3:22-cv-00214-SDD-RLB

v.

KYLE ARDOIN, in his
official capacity as Secretary
of State for Louisiana
DEFENDANT

EXPERT REPORT OF

Michael C. Hefner

ON BEHALF OF INVERVENOR

STATE OF LOUISIANA

May 29, 2022

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EXPERT WITNESS REPORT OF MICHAEL C HEFNER

I. Introduction

This report has been prepared at the request of the Louisiana State Attorney General's office representing the State of Louisiana, the intervenor in the case of *Press Robinson, et. al v. Kyle Ardoin*, CA No. 3:22-cv-00211-SDD-RLB, and *Edward Galmon, Sr., et. al v Kyle Ardoin*, CA No. 3:22-cv-00214-SDD-RLB. Geographic Planning & Demographic Services, LLC was retained by the Attorney General's office as an expert to determine the effects the Illustrative Plans filed by the Plaintiffs to this case have on the communities of interest within the State.

My rate for the State of Louisiana is $285 per hour. I have testified previously in the cases of *Terrebonne Parish Branch NAACP, et. al v. Piyush Jindal*, CA No. 3:14-cv-69-JJB-SCR and *Keith Kishbaugh vs The City of Lafayette Government, Lafayette Parish Government, and Lafayette City-Parish Government*. I have not published any publications within the past ten years.

I am an expert in demography and have been practicing in that field in a professional capacity since 1990. As a life-long resident of Louisiana, I am very familiar with the State of Louisiana and many of the parishes and communities within. Since my early years, I have traveled to many of the various parts of the State leading bicycling tours as well as my own private cycling destinations. In my official capacity as a demographer and a specialist in redistricting, my work has taken me to most of the parishes and communities in the State.

Projects ranged from parish and regional housing studies, school attendance zone configurations, student assignment work for school desegregation cases, student population projection studies, site location analysis, private marketing studies, economic development studies, technical assistance with demographics and grant submissions, and numerous election district redistricting projects. All those projects involved an intensive study of the areas being served. The studies encompassed researching news articles, historical publications, demographics, community characteristics, and interviews with local citizens. This level of research better prepared me for the work being done on behalf of the client and produced a quality product that was more responsive to their needs. That experience has well prepared me to serve as an expert witness in this case regarding communities of interest and how they are affected by the Congressional reapportionment plans since I am very familiar with the majority of them.

A full description of my qualifications is found in Appendix Exhibit 2 in accordance with 28 U.S.C. §1746, 26(a)(2)(B), the Fed. R. Civ. Proc. and Rules 702 and 703, the Fed R. of Ev.

A. Factual Background

On August 12, 2021, the U.S. Census Bureau released the PL 94-171 redistricting file based on the 2020 census. The Louisiana Legislature then embarked upon a State-wide tour of each of the regions of the State to gather citizen input prior to convening the legislative session to take up State-wide and Congressional redistricting.

On or about February 18, 2022, the Legislature voted to approve the Congressional district plan under HB 1/SB 5. The Governor vetoed the plan stating that a second majority African American Congressional district needed to be created to match the African American State-wide proportionality.

The Legislature subsequently overrode the veto thus putting the Congressional plan in to effect. The Plaintiffs then filed their respective complaints against the plan.

B. Methodology

Plan Review and Analysis

The election plans were reviewed using the latest 2020 Census Data in the PL:94-171 file as released to Louisiana on August 12, 2021 for redistricting purposes. Both the U.S. Department of Justice and the State of Louisiana specify this file to be used in the absence of any approved special census counts.

The precinct geography used for the plan reviews was based on the 2021 state-wide precincts in effect as of the 2020 Census. The registered voter data attached to those precinct files were from the August 2021 voter database and were obtained from the Louisiana Legislative website.[1]

Evaluations of Enrolled plan and the Illustrative Plans submitted by the Plaintiffs were reviewed in the context of customary traditional redistricting criteria as described in Section 2 of the Voting Rights Act but more specifically to the charge, the preservation of communities of interest.[2]

Technical Specifications

GIS Software:	Maptitude for Redistricting ver. 2022, Caliper Corporation. ArcPro 2.9, ESRI, Inc.
Election Data:	Louisiana Secretary of State Election databases.

[1] This was the first set of registered voter data disaggregated to the census block level prepared for the reapportionment of the Congressional districts. Subsequent versions updated the voter data to the December 2021 database. The differences are insignificant to these reviews.

[2] The Louisiana Legislature adopted Joint Rule 21 and HCR 90 of the 2021 Regular Legislative Session that established the redistricting criteria to be used for State-level redistricting purposes. https://legiscan.com/LA/text/HCR90/2021.

Base Maps: U.S. Census Bureau TIGER 2020 Line File, Enhanced Caliper Street file, precinct geography updated as found on the Louisiana Legislative Website

II. What Defines a Community of Interest?

Communities of interest are formed by people, often within a geographic or a defined area, that self-identify themselves with others who share similar traits based on political issues, culture, economic, occupation, religion, or local traditions.[3] That commonality results in interests and concerns that affect the group as a whole.

Because of that self-identification, there is no set standard for a community of interest. Criteria that bind people together into a cohesive unit vary from one group to another as are set by the group. The specificity of the issues share by a community of interest also can vary by level of geography.

As an example, parents of students attending a particular high school can constitute a community of interest centered around school issues and may be very specific. Larger geographic areas, such as precincts, may have communities that are connected by issues in their neighborhood and surrounding areas. In fact, precincts often encompass neighboring neighborhoods within the specific geographic boundary of a precinct, and they gather to vote at a specific location.

Likewise, parish-level geography may take a more generalized approach to issues that affect the parish itself. A collection of parishes constitutes a region that may have in common issues at a state-wide or national interest. In essence, the larger the geography, the more generalized the cohesive characteristics that bind people into a community of interest.

A good example of a regional community of interest is where parishes that share similar political concerns are grouped together into a Congressional district. That allows a more homogenous representation of that area in Congress when it comes to national issues and gives voice to those residents.[4] Many states formally recognize the importance of maintaining communities of interest when it comes to redrawing the election districts after each census.[5] While Louisiana does not have an adopted guideline when it comes to

[3] Duda, Jeremy "The Redistricting Conundrum: Just What is a Community of Interest?", AZ Mirror, December 2, 2021. https://www.azmirror.com/2021/12/03/the-redistricting-conundrum-just-what-is-a-community-of-interest/
[4] Buchler, Justin. "Competition, representation, and Redistricting: The Case against Competitive Congressional Districts." Journal of Theoretical Politics 17, no. 4: 431-463.
[5] "Communities of Interest", Brennan Center for Justice, November 2010. https://www.brennancenter.org/sites/default/files/analysis/6%20Communities%20of%20Interest.pdf

communities of interest, many other states do.[6] A review of those guidelines helps illuminate the definition and importance of communities of interest.[7]

III. Preservation of Communities of Interest in Redistricting

Preservation of communities of interest is one of the seven traditional redistricting criteria used when designing election districts. From a representation perspective, keeping communities of interest together allows those persons to have a voice in affairs that affect them. When an election plan splits apart those communities, those voices are submerged, resulting in a disenfranchisement in the electoral process and in representation on issues that affect them.

Because modern day redistricting software is so powerful and robust with features that can quickly calculate demographic and plan boundary changes, a demographer drawing an election plan can easily become focused on the mathematical perfection of a plan. Use of specifically defined characteristics such as precinct and parish boundaries, total population counts, racial makeup, and voting age populations often dominate the attention of the mapmaker because they are easy to quantify. Inclusion and exclusion of areas in a district map can be readily ascertained on the effectiveness of the desired outcome of the mapmaker.

Because communities of interest are not always clearly defined, they are very easy to overlook, particularly when inclusion of an area that some see having nebulous characteristics complicates the mathematics of a plan. Without local knowledge, it can be difficult to readily identify areas that share common issues, culture, economics, and even religion.

However difficult it may be to factor in communities of interest in pursuing a mathematically based plan, failure to do so can exert a tremendous obstacle to the effectiveness of an election plan. This can be especially true with a state's Legislative or Congressional plan.

Since *Miller v Johnson*, the Supreme Court has recognized the importance of communities of interest as a race-neutral criteria in redistricting.[8] This approach legitimizes representation by having a diversity of interests among the population is reflected in the elected body.[9]

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[6] The Louisiana Legislature adopted Joint Rule 21 and HCR 90 of the 2021 Regular Legislative Session has a provision elevating the preservation of the communities of interest within the same district above that of respecting established boundaries of parishes, municipalities, other political subdivisions, and natural boundaries of the State.

[7] Id.

[8] Miller v. Johnson, 515 U.S. 900 (1995).

[9] M Malone, Stephen J. "Recognizing Communities of Interest in a Legislative Apportionment Plan." Virginia Law Review, vol. 83, no. 2, 1997, pp. 461–92, https://doi.org/10.2307/1073783.

IV. Identifiable Regions in Louisiana

For this analysis, two regional communities of interest maps will be used. The effects of the Legislature adopted HB1 Congressional maps and the Plaintiffs Illustrative Plan on those regional areas will be compared.

The first analysis will use the five distinct regions that have been identified by the Louisiana Regional Folklore Program (LRFP) and will be used as the basis to show the effects on those establish regional communities of interest.[10] A map of the LFRP regions is shown below.

MAP 1

These regions roughly correspond to the regional communities of interest identified by the State of Louisiana and commonly used with cultural and tourism activities.[11] A map of those regions is shown below.

[10] Five Regions of Louisiana, Louisiana Regional Folklife Program. The program is a cooperative endeavor between Louisiana universities and the Louisiana Folklife Program within the Division of the Arts. One of the purposes is to identify and document folk cultural traditions and artists. The program is based at Louisiana Tech University. URL: https://www.nsula.edu/regionalfolklife/regions/default.htm

[11] About Louisiana, Map of Regions. http://microsite.smithsonianmag.com/ads/louisiana/about-louisiana/music.html

MAP 2

Characteristics of the Five Regions

The Louisiana Regional Folklife Program briefly describes each region as follows:[12]

Region 1: Northeast and north central Louisiana is predominantly British and African American, and includes both Lowland and Upland South culture.

Region 2: The Red River Valley cuts across the state from Shreveport to the Mississippi River and includes Shreveport, Alexandria, and Natchitoches. The old Neutral Strip that separated Spanish Texas and French Louisiana stretches down the Sabine River from the Zwolle area through Beauregard Parish. The Red River Valley and Neutral Strip region is home to many folk groups and traditions, including several groups of Native Americans.

Region 3: The Acadiana parishes are located from west of the Atchafalaya Swamp to the Texas border. Most of the region is rural, but includes Lafayette, Lake Charles, and New Iberia. The region includes the Louisiana Prairie, Bayou Teche, coastal marshes, and parts of the Atchafalaya swamp. The predominant culture is a complex blend of French, Spanish, and African. Other cultural groups include Anglos, Laotians, Chitimacha and Koasati Indians.

Region 4: Including three distinct cultural regions, Louisiana's Florida Parishes comprise the "toe of the boot" and are predominantly British and African American. There are also significant numbers of Hungarians and Italians. The predominant culture

[12] Five Regions of Louisiana, Louisiana Regional Folklife Program.

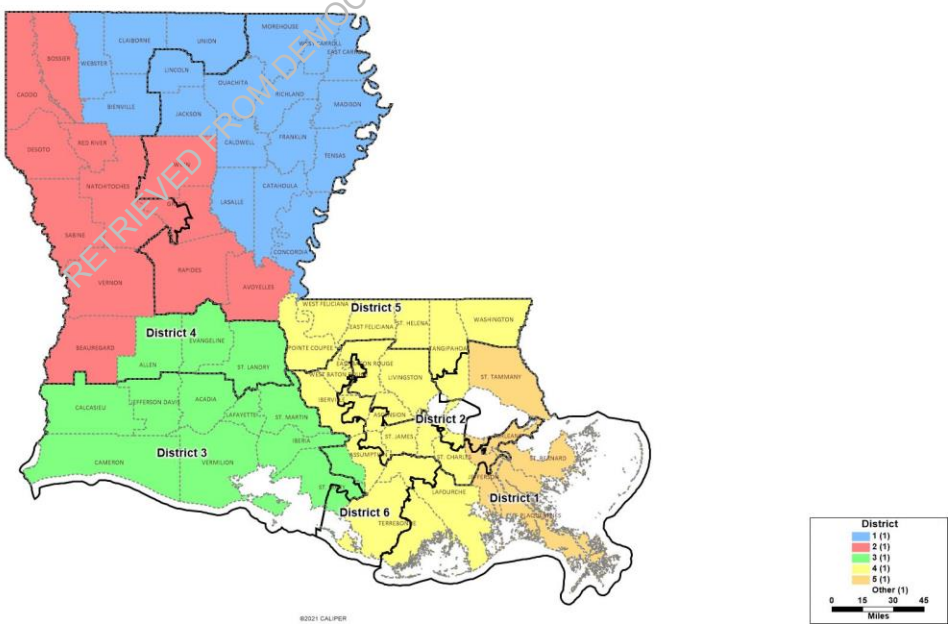
of the Mississippi River Road parishes from St. Francisville to north of New Orleans is a blend of French and Lowland South plantation culture. Eastern Acadiana includes Bayou Lafourche and the Terrebonne marshes, and parts of the Atchafalaya swamp where the dominant culture is a blend of French, Spanish, African and Houma Indian.

Region 5: The city of New Orleans and the surrounding suburban and rural parishes make up Region 3. New Orleans urban culture is a complex blend of French, African, Spanish, German, Irish, and Italian influences. Other groups include Latinos, Vietnamese, Croatians, and Isleños. This region includes the parishes of Jefferson, Orleans, Plaquemines, St. Bernard, and St. Tammany.

V. Comparison of HB1 Congressional Map

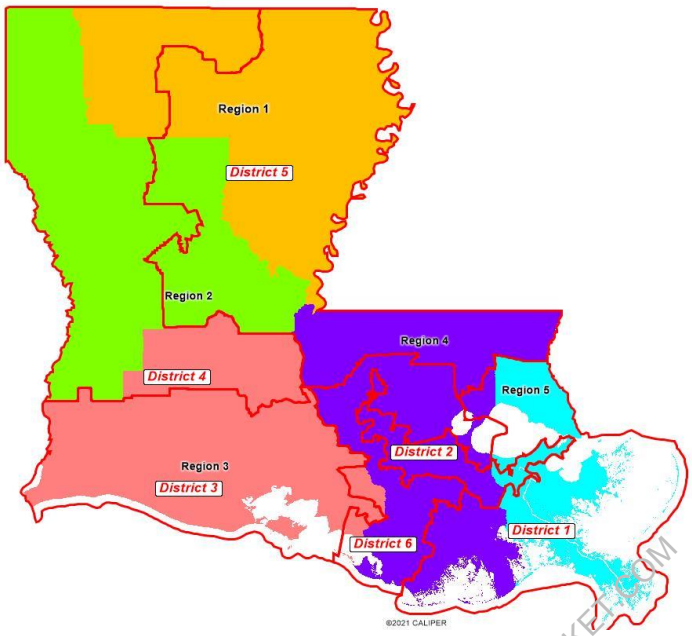
The boundaries of the HB1/SB5 Congressional Map are overlaid on the LRFP regions with the parish outlines are shown in Map 3.

MAP 3



Map 4 shows a simplified version of the map with the regions shaded and the HB1 district outlines.

MAP 4



The Congressional District 1 (CD 1) encompasses most of Region 5 and the southern part of Region 4. CD 2 follows the Mississippi River to include the river parishes in Region 4 and part of Orleans Parish in Region 5. Together CD 1 and CD 2 share the traits of the communities in those two regions. That part of Region 5 in CD 1 is a blend of French, African, Spanish, and European influences.

The river parishes assigned to CD2 from Region 4 share many of the same traits, especially French, African, and some European. Those communities share common ancestry and culture. Many of the activities center around the Mississippi River, which plays a predominate natural feature in their respective parish. Economically this area is linked by the petrochemical industry that lines both sides of the Mississippi River from New Orleans north to Baton Rouge.[13]

The communities of interest for both CD 1 and CD 2 are related. The commonality of culture, ancestry, and economic activity maintains the integrity of those communities of interest assigned to those two Congressional districts.

[13] "The Mississippi River Industrial Corridor (MRIC) includes the parishes: Ascension, East Baton Rouge, Jefferson, Iberville, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, and West Baton Rouge." Louisiana Hazardous Substances Emergency Events Surveillance Mississippi River Industrial Corridor Factsheet, Louisiana Department of Health and Hospitals. URL: https://ldh.la.gov/assets/oph/Center-EH/envepi/LaTSIP/Documents/Other/HSEES-Miss_Ind_FS.pdf

CD 3 encompasses the majority of Region 3. This is known as the Acadiana area. The boundary of CD 3 on the east side uses the middle levee of the Atchafalaya Basin and continues south using the Atchafalaya River. This is a long-time natural boundary which historically separated the Acadiana area from the eastern part of the State.[14] The western boundary goes to the Texas boundary, which forms a natural political boundary. According to the LRFP, the predominate culture in CD 3 is French, Spanish, and African. Other cultural groups include Anglos, Laotians, and American Indian. The communities of interest that form the core of the Acadiana region within CD 3 remain intact. Many of these communities are highlighted as cultural destinations in the State of Louisiana travel promotions.[15]

CD 4 combines the three northern parishes of Region 3 with parishes from Regions 1 and 2. This combination is relatively consistent with composition of the communities along the western side of the State having common ancestral and cultural links to French Creoles, Acadians, Spanish, European, and American Indians found in Regions 1, 2, and 3. Cultural links along the Red River Valley in particular has commonality with the northern part of the Acadiana Region as the Red River connected to the Atchafalaya River at its juncture with the Mississippi River and formed an important water transportation route. The regional communities of interest within CD 4 are largely related and form a consistent aggregation of the population.

CD 5 pairs the eastern parishes in Region 1 and 3 together which collectively form the agricultural center of the north Delta area of the State.[16] The cultural traits are largely British and African American and includes Lowland and upper South culture but also includes some French.

This area is then combined with the northern part of Region 4 which also consists of British and African American cultures along with Lowland and South plantation culture. This area is commonly referred to as the Florida Parishes due to its unique history.[17] The communities of interest within CD 5, while somewhat

[14] Writing in the Journal of Geography, Vol. XXXIII, March 1934, Minnie Kelley said "Acadian South Louisiana, commonly known as the Attakapas District, lies south of the thirteenth parallel of Latitude. The Atchafalaya and the Mermentau Rivers mark the eastern and western boundaries respectively. The southern limit of the region is the Gulf of Mexico while the northern limit is the Avoyelles District." Devilliers, Gladys, "The Attakapas Territory", Acadiana Ancestral Home, 1998.
http://www.gladysdevilliers.acadian-home.org/Atacapas-Territory.html

[15] About Louisiana, Map of Regions.

[16] "The existing land use of the North Delta District is predominantly for agricultural and forest purposes. These two categories of land use classification account for 98.5 percent of the total area of the North Delta District." Comprehensive Economic Development Strategy 2015-2020, North Delta Regional Planning & Development Districts, Inc. URL: https://northdelta.org/wp-content/uploads/2021/09/2015-2020-CEDS.pdf

[17] The Florida Parishes include St. Helena, St. Tammany, E. Feliciana, Washington, Livingston, and W. Feliciana. They were part of Louisiana under French, Spanish, and British rule. For a short time in 1810 they were the

diverse, are not incompatible. Commonality in ancestry and cultural traits can be found as well as a common agrarian based economy.

CD 6 takes in what CD 2 and CD 4 left out of the Region 4 area. The population center in East Baton Rouge is combined with those parts of the more rural parishes to the south but offset from the Mississippi River corridor. This combines the French, African American, and European influences of the southwestern part of Region 4 in the Terrebonne, Assumption, and Iberville parishes together. Added to this are the Spanish, French, British and African American influences in the Florida Parishes.

The communities of interest are a more complex combination than in some of the other Congressional districts. The Florida Parishes themselves capture the diversity of the State as a whole.[18] However many of the parishes share the same ancestry despite being more economically diverse with logging in the north part of CD 6 and the oil industry, construction, farming and fishing in the southern portion.[19] [20]

Summary of Enrolled HB 1 Congressional Plan

Overall, the boundaries of the enrolled HB1 Congressional plan maintain traditional communities of interest. Where it was necessary to divide parishes to balance the population counts, the boundaries were appropriate as dictated by the geographical features of the areas being divided.

VI. Plaintiffs Illustrative Plans

The Plaintiffs in this case have filed four illustrative plans, all created for the purpose of creating a second majority-minority Congressional district. The four plans are Robinson Illustrative Plan, Galmon Illustrative Plan 1, Galmon Illustrative Plan 2, and Galmon Illustrative Plan 3. Each plan will be analyzed for its effect on the communities of interest established *supra* with the Enrolled Plan discussion.

My observation and opinions on the Plaintiffs plans are based on over 32 years of experience in providing professional redistricting and various demographic services in a majority of the parishes in Louisiana. The work entailed detailed demographic studies at both parish and municipal levels. My personal and professional familiarity with many of these areas provides a good background to base my opinions upon.

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independent Republic of West Florida. Kingsley, Karen, Florida Parishes of Louisiana. URL: https://64parishes.org/entry/florida-parishes-of-louisiana

[18] Gardner, Joel, Folklife in the Florida Parishes, Folklife in Louisiana. URL: https://www.louisianafolklife.org/lt/Virtual_Books/Fla_Parishes/book_florida_overview.html

[19] Id.

[20] Occupational Breakout of the Civilian Labor Force by Sex and Ethnic Group, Houma MSA 2019, Louisiana Workforce Commission. URL: https://www.laworks.net/LaborMarketInfo/LMI_LaborForceDiversity_MSA.asp

Overview of Plaintiffs' Plans

The Plaintiffs' mapmaker utilized the same approach to reach their desired objective of creating a second majority African American Congressional district in all four plans.[21] The two targeted districts are Congressional District 2 (CD 2) and Congressional District 5 (CD 5). The population anchor with CD 2 is New Orleans area and CD 5 has its population anchor in the Baton Rouge area.

All four plans are based on the presumption that African American Louisiana residents all share the same interests and issues because of their race, regardless of where they geographically reside. This has the effect of the Plaintiffs creating and defining their own community of interest based solely on racial characteristics and then parsing those members among those two Congressional districts.

All four plans use some geographical variation of identifying the majority African American concentrations to include in either CD 2 or CD 5. Since the New Orleans area is heavily populated and has a high number of African Americans, creating a majority African American Congressional district was not as much a problem as with CD 5.

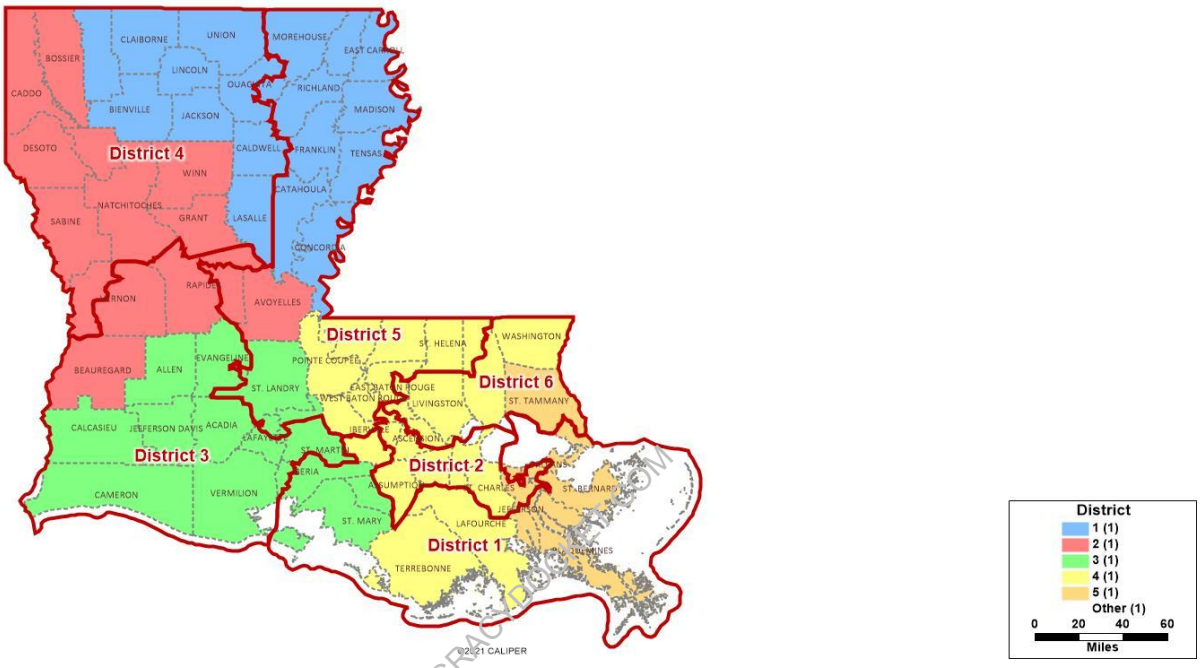
For CD 5, the mapmaker uses various pathways among the four plans to excise African Americans out of their traditional communities and place them with others in that Congressional district. In addition to the selective inclusion of African Americans into CD 5, it was quite evident that the mapmaker took significant efforts to avoid areas of White population concentrations so as to not be included.

The discussions of the individual plans will address the highlights of the approaches the mapmaker had to use to achieve the stated goal of a second majority African American districts that also had a minimum mathematical threshold for the African American population.

[21] The Louisiana media is replete with numerous articles regarding the desire of certain legislators, community leaders, and the Governor on need to create a second majority African American Congressional District.

A. Robinson Illustrative Plan

MAP 5-Robinson Illustrative Plan 1 Overlaid on LRFP Regions



Immediately upon viewing the Robinson Illustrative Plan, it was evident that the mapmaker had identified areas where a majority African American population could be singled out to place into a prospective minority district. The most stunning carve out was taking the mostly African American population in the north part of Lafayette Parish (and the City of Lafayette); adding it to the entirety of St. Landry Parish to capture that African American population and assign those citizens to Congressional District 5.

Furthermore, the plan then carves out the predominantly African American population from Evangeline Parish to also add to CD 5. Ville Platte is the population and cultural center of Evangeline Parish which isolates the City from the rest of Evangeline Parish when it comes to Federal representation.[22] It is also heavily African American populated as compared to the rest of the Parish.

These areas identify with the Acadiana area. Evangeline Parish was created out of the old St. Landry Parish many years ago.[23] They share the same values, sense of community, cuisine, culture and traditions

[22] https://www.louisianatravel.com/cities/ville-platte

[23] "Evangeline Parish was once part of St. Landry Parish.", LSU Ag Center. https://www.lsuagcenter.com/portals/our_offices/parishes/evangeline/features/about

of the Acadiana area.[24] Being on the west side of the Atchafalaya Basin, those attributes are unique as compared to the rest of CD 5.

Separating those African American residents from their fellow neighbors and placing them into an entirely different Congressional district effectively disenfranchises them. While they add the marginal gains in the African American population needed for the Plaintiffs' purpose, they add nothing to the representation of issues that affect them in the Acadiana area. Effectively they are submerged into the vastly more numerous populations of CD 5 which lies in the Baton Rouge area.

Looking northward, the Robinson Illustrative Plan then carves out much of the White population in the Region 1 area and assigns them to the Region 2 area as part of CD 4. The majority African American population on the east side are then assigned to CD 5. This move weakens the collective voice of the north Delta region of the State; a weakness they can ill afford given the poverty and economic issues facing that area.[25]

In the Ouachita Parish area, the Robinson plan splits the City of W. Monroe into CD 5 and CD 4. With a 2020 census population of 12,459 the Robinson plan surgically carves out 3,338 African American residents out of the 5,632 assigned to CD 5 to join up with E. Baton Rouge Parish to the south.[26] The rest of the City is assigned to CD 4 thus splitting up this community of interest among two Congressional districts. With the way the City was divided to specifically move the majority of African Americans into CD 5, it is my opinion that race was the deciding factor on who to put in or out of CD 5.

East Baton Rouge Parish is divided up to carve out the heavily African American residents in the parish. This constitutes a line generally north of Florida Blvd. and excludes the mixed-race population between Florida Blvd. and Government St. as well as the majority White residents south of Government and east of Nicholson Blvd. The boundary carefully goes around the southwest and west side of the Parish to avoid the White populations in that area.

In the Florida Parishes area (Region 4), St. Tammany Parish is carved out between CD 5 and CD 6. That portion of the parish assigned to CD 5 is predominantly African American.[27] This move separates the small communities of Kentwood, Tangipahoa, Roseland, Amite City, and Independence into CD 5 along with the

[24] Id.
[25] The north Delta region has been specifically identified as an area of extreme need by the inclusion of that area into the Delta Regional Authority, a Federal program. The Louisiana delta parishes are among the 252 counties and parishes served by the Delta Regional Authority that make up the most distressed area of the country. URL: https://dra.gov/about-dra/about-delta-regional-authority/
[26] The City of W. Monroe has a total 2020 Census White population of 7,538 and a Black population of 4,452.
[27] The 2020 Census counts for this area of St. Tammany Parish is a total population of 21,698 of which 9,419 are White and 11,351 are Black.

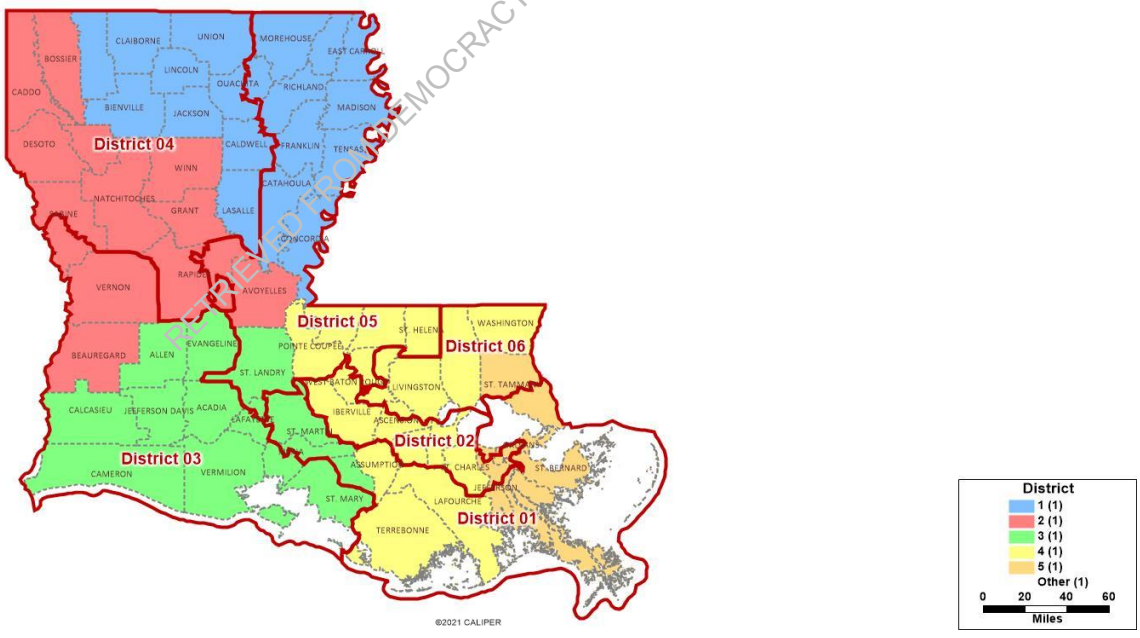
population center carve-out of E. Baton Rouge.[28] What issues affect these small communities will carry little weight given their small population in relation to a district that stretches through Baton Rouge, Lafayette, Alexandria, and Monroe.

Taken in totality, just these areas alone are being singled out based on their race and for no other reason. They are either not connected to the rest of CD 5 as a like-minded community or their voices are being diminished by isolating them from their fellow citizens.

Opinion: The enrolled HB 1 Congressional plan has demonstrated that a race-neutral approach that preserves communities of interest while using the other traditional redistricting criteria can be accomplished. With that as a benchmark, the only justifiable reason to tear these African American communities away from their traditional areas of common interests is to create another majority-minority Congressional District in the Robinson Illustrative Plan using a race-central approach.

B. Galmon Illustrative Plan 1

MAP 6- Galmon Illustrative Plan 1 Overlaid on LRFP Regions



Similar to the Robinson plan, the Galmon Illustrative Plan seeks out majority African American communities with little respect to their home base parishes and communities. St. Landry Parish and the

[28] In the Robinson Plan, the E. Baton Rouge carve-out for CD 5 has 184,556 persons of which 139,181 are Black (2020 Census).

northern part of Lafayette Parish and the City of Lafayette are carved out of the Acadiana area (Region 3) and assigned to Congressional District 5.

Even more egregious, the Galmon Illustrative Plan 1 takes St. Martin Parish and half of Iberia Parish out of the Acadiana region and places it in Congressional District 1. This district encompasses the Metairie area and the Northshore area of the Greater New Orleans area.

St. Martin Parish is the genesis of the Acadiana culture.[29] It shares a common history with the eastern half of Iberia Parish by virtue of the Bayou Teche which served as a historic economic and cultural lifeline.[30] Everything from music, culture, cuisine, ancestry, and traditions are unique to St. Martin Parish as compared to the Greater New Orleans area. Taking St. Martin Parish out of its historical place in Congressional District 3 literally rips the historical heart of Acadiana out and overshadows it with New Orleans.

Given the rural nature of St. Martin and Iberia Parishes and the uncommon association with the Greater New Orleans population, the effectiveness of any voice on Congressional matters is virtually none. St. Martin and part of Iberia Parish are isolated from its own heritage and history for no other reason than racial considerations arising from the drafting of other Congressional districts. They are merely cogs in the machine to help reach the desired population deviations after CD 2 and CD 5 were created.

On the northeastern end of the State, the Galmon Illustrative Plan 1 does much of what the Robinson plan does by isolating the majority African American parishes of the north Delta area from the rest of Region 1. Accordingly, the City of W. Monroe is split into a smaller unit with even more race-based specificity and assigning it to CD 5.

That part of the City has almost as many African Americans being carved out as with the Robinson plan but with much fewer Whites, thus helping their African American percentages in the plan.[31] These African Americans would then share the same Congress person as that part of E. Baton Rouge Parish carved out for

[29] "It can be said that Acadiana was born when 200 members of the Acadian resistance settled around present-day St. Martinville in 1765.… Today, the founding cultures, Acadian, African, French, Italian, and Spanish, have maintained their cultural identities while blending together to form a savory "cultural gumbo"." St. Martin Parish History, St. Martin Parish Government. URL: https://www.stmartinparish.net/about/st-martin-parish-history/

[30] "Early economic development of the Atchafalaya Basin hinged on the Bayou Teche. Before roads, the little Teche, not the Atchafalaya, was the highway from the Gulf of Mexico into the heart of Louisiana. The Teche was navigable over 100 miles, yet just wide enough, deep enough and swift enough to maneuver. Several Bayou Teche settlements materialized because of the timber and waterborne economy.", The Teche Project, URL: https://www.techeproject.org/bayou-teche-paddle-trail/history-culture/#:~:text=History%20%26%20Culture%20The%20Bayou%20Teche%20takes%20you,a%20booming%20cypress%20industry%20in%20the%20early%201900s.

[31] The CD 5 split has 3,176 Blacks and 1,330 Whites (2020 Census).

CD 5, which is far more numerous.[32] Due to that severe imbalance in the geographical population, the African American residents in Ouachita Parish will be effectively disenfranchised. They will not constitute enough of a population to warrant much attention on Federal matters from a Congress person more beholden to a much larger political base in the Baton Rouge area.

East Baton Rouge Parish is divided up in a similar manner as in the Robinson Illustrative Plan. The plan purposely places almost all of the African American population into CD 5. This keeps the White neighborhoods out of CD 5 to improve the African American percentages in the plan.

The boundary that divides Rapides Parish and goes through the heart of the City of Alexandria is even more bizarre.[33] Of a total of 35,866 persons being placed in CD 5, 26,287 are African American. At one point the boundary passes through a residential area, putting one part in CD 4 and the other part in CD 5. A minor drainage ditch divides this neighborhood among CD 4 and CD 5.

Opinion: Other than racial considerations, it is difficult to rationalize the splitting of a large community of interest as represented by Alexandria into two separate Congressional Districts and with one of those districts encompassing the northern half of E. Baton Rouge Parish.

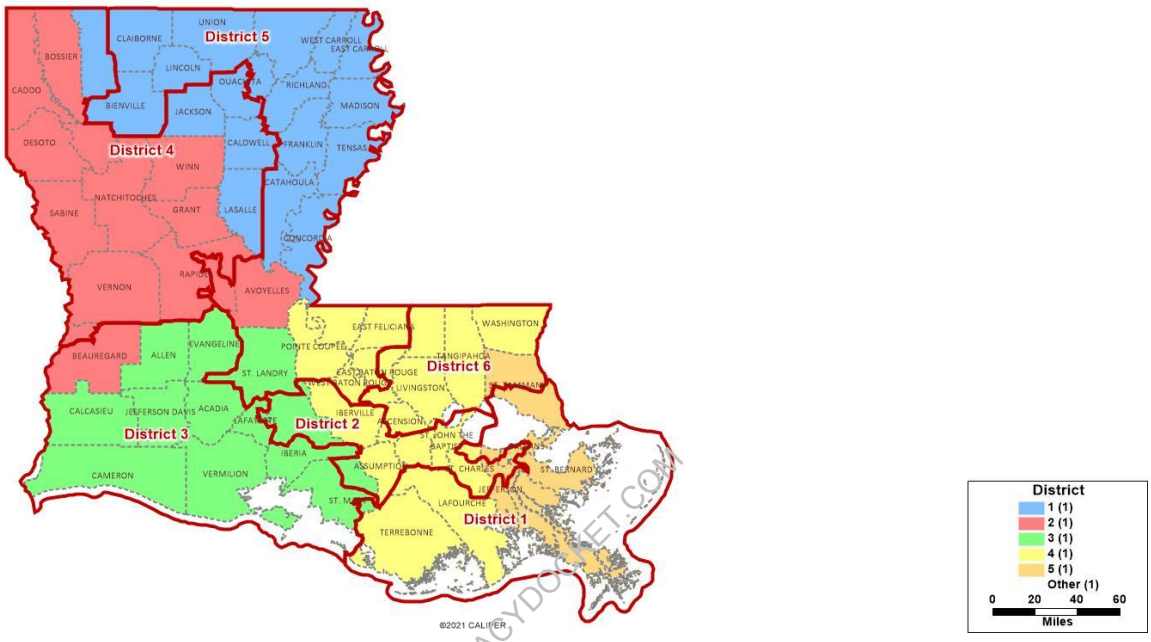
There is even less justification that St. Martin Parish and half of Iberia Parish would be grouped into a New Orleans-centric Congressional district. There is little in common and such a move disenfranchises those residents who cannot compete against the sheer numbers in the Greater New Orleans area.

The HB 1 plan has demonstrated that a race-neutral approach preserves the communities of interest in North and Central Louisiana area and the east end of the Acadiana region in Louisiana.

[32] Galmon Illustrated Plan 1 has 222,196 persons in CD 5, of which 158,199 are Black (2020 Census).
[33] The 2020 Census for the City of Alexandria was 47,212.

C. Galmon Illustrative Plan 2

MAP 7- Galmon Illustrative Plan 2 Overlaid on LRFP Regions



Roux-base gumbo vs tomato-based gumbo. Cajun two-step vs Second Line. Cajun band vs jazz band. Cous-Cous vs. grits. Old world French vs Parisian French.

In one State, but worlds apart and yet combined together under Galmon Illustrative Plan 2 are the City of Lafayette and St. Martin Parish with the City of New Orleans. Completely different cultures, different history, and completely different communities of interest, yet this plan adds the core of the Acadiana area to some of the River Parishes and New Orleans.

While there is a thread of ancient French and Spanish ancestry, they are as different today as the dialects spoken.[34] And the issues that concern the Lafayette/St. Martin Parish areas are just as different as urban New Orleans.

Much like Galmon Illustrative Plan 1, St. Landry Parish and the easternmost parishes of the north Delta region are paired with the heavily populated African American northern half of E. Baton Rouge Parish. While sharing the same racial characteristics, they share little in common as communities of interest.

The boundary dividing the City of Alexandria and Rapides Parish is softened by including the predominantly African American community of Lecompt. It nonetheless accomplishes the splitting of

[34] "Cajun or Creole: What's the Difference", URL: https://www.neworleans.com/restaurants/where-to-eat/cajun-or-creole/.

Alexandria and Rapides Parish into two Congressional districts with little rational, with the exception of the overt racial considerations needed to make the plan meet the stated objectives.

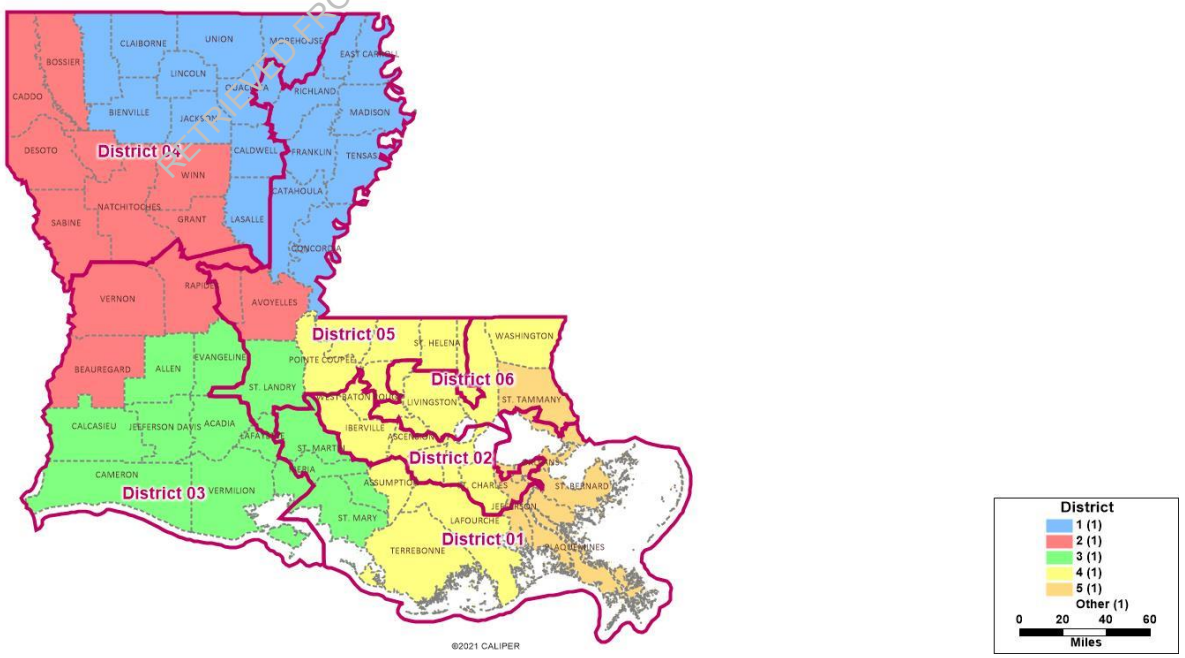
East Baton Rouge Parish continues under this plan configuration to carve out the heavily African American residents in the parish. There are but minor precinct swaps between this plan and the other Plaintiff plans.

Opinion: This plan pairs up two major areas of the State that have little in common when it comes to daily community life, history, culture, music, cuisine, and national issues. There is no ration basis for a configuration that promotes this or the division of other towns and cities other than if race was the primary consideration to meet specific goals and objectives. Likewise, the division of Rapides Parish, and the cities of Alexandria and W. Monroe can only be justified using racial considerations.

The effort to create a second majority African American Congressional district comes at the expense of the preservation of readily identifiable and long-standing communities of interest. It has been demonstrated in the HB 1 plan that these parishes can be kept together in a race-neutral manner using traditional redistricting criteria.

D. Galmon Illustrative Plan 3

MAP 7- Galmon Illustrative Plan 3 Overlaid on LRFP Regions



Harking back to the Robinson Illustrative Plan and Galmon Illustrative Plan 1, the northern part of Lafayette Parish and the City of Lafayette are put into Congressional District 5. St. Landry Parish again

joins CD 5 as does the southeastern quarter of Rapides Parish, including the dividing of the City of Alexandria. The largely predominantly African American parishes of the eastern north Delta parish are included into CD 5 thus sharing that representation with the more populous north E. Baton Rouge Parish.[35]

As with the two earlier plans referenced, the City of W. Monroe is divided between two Congressional districts. Under Galmon 3, the selective carve-out for CD 5 represents 4,521 persons of which 2,933 are African American. The rest of the City is in CD 4.

As in the Robinson plan, Galmon Illustrative Plan 3 carves up St. Tammany Parish. The Tangipahoa River westerly to the Parish boundary is put in CD 5. This area is primarily African American. The predominantly White eastern part of the Parish is included in CD 6, thus avoiding the putting Whites in CD 5.

E. Baton Rouge Parish retains the majority of the placement of African Americans in the central to north part of the parish in CD 5. There are but a few precincts different than the other plans.

Opinion: Despite the minor plan configuration changes, the Congressional district boundaries in Galmon Illustrative Plan are still established by the racial composition of areas either being included or excluded based only on the race of the population. This is an identical dynamic to the other Plaintiff plans. Like the other Illustrative plans, it is a race-based plan.

VII. Conclusion

Whereas the Engrossed HB1 plan largely follows the regions identified by the Louisiana Rural Folklife Program and keeps many more communities of interest intact, the Plaintiffs' plans do not.

Modern redistricting software possesses considerable power to quickly evaluate the effects of moving populations in and out of prospective districts. It is very easy to get focused on a pre-determined outcome and employ the power of the software to try and achieve it. Efforts by the Plaintiffs to use this tool to establish a second majority African American Congressional District in proportion to the overall State ratio results in plan configurations that break up both major and minor communities of interest.

The fact that so many communities of interest were either divided among the Congressional districts or paired with unlikely and dissimilar larger cities begs the question of whether the distribution of African Americans are truly compact enough to create a second majority-minority Congressional district. In the Statewide aggregate, the ratio may suggest that it is. But the actual distribution of the African American

[35] Under the Galmon Plan 3, 210,172 persons are carved out for CD 5, of which 155,806 are Black (2020 Census).

population tells a different story when it takes extreme and race-centric measures to arrive at even bare minimum majority configuration.

Considering the extent to which disparate communities of interest are paired together under all of the Plaintiffs' plans and the splitting of other small towns and cities, the only reasonable conclusion to reach is that the Plaintiffs' plans were designed specifically to reach a pre-determined minimal mathematical threshold that could result in the creation of a second majority African American Congressional district. This is the stated result the Plaintiffs were seeking.

The process used by the mapmaker to meet those goals subrogated other traditional redistricting principals, such as respecting communities of interest. The effort elevated the racial component in designing a plan above the other traditional redistricting criteria.

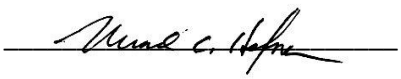
The Engrossed HB1 Congressional plan shows that a reasonable plan can be drawn in a race-neutral manner and respects the use of traditional redistricting principals. It may not lead to the outcome some were looking for but based on the analysis of the various plans, that areas of traditional areas representation and preservation of communities of interest are far better.

VIII. Certification

The opinions expressed above are sworn, under penalty of perjury, to be true and based on the facts and criteria available to the expert witness as of the time of this report. This expert reserves the right to supplement this report as new information becomes available or as requested by the Defendant. Any documents and information relied upon not footnoted are listed in the Appendix.

Michael C. Hefner, Esq.

Signed this 29th day of April, 2022.

s/s 

Michael C. Hefner, Esq.
Expert Witness for the
Louisiana Secretary of State

APPENDIX

Exhibit 1

Table of Authorities

List of Resources and References:

Louisiana Legislature Joint Rule 21 and HCR 90 of the 2021 Regular Legislative Session that establishing the redistricting criteria to be used for State-level redistricting purposes. https://legiscan.com/LA/text/HCR90/2021.

Five Regions of Louisiana, Louisiana Regional Folklife Program. URL: https://www.nsula.edu/regionalfolklife/regions/default.htm

URL: https://www.laworks.net/LaborMarketInfo/LMI_LaborForceDiversity_MSA.asp

Malone, Stephen J. "Recognizing Communities of Interest in a Legislative Apportionment Plan", *Virginia Law Review* Vol. 83, No. 2 (Mar., 1997) p. 465.

About Louisiana, Map of Regions. https://www.laworks.net/LaborMarketInfo/LMI_LaborForceDiversity_MSA.asp

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"Cajun or Creole: What's the Difference", URL: https://www.neworleans.com/restaurants/where-to-eat/cajun-or-creole/.

Devilliers, Gladys, "The Attakapas Territory", Acadiana Ancestral Home, 1998. https://www.laworks.net/LaborMarketInfo/LMI_LaborForceDiversity_MSA.asp

Comprehensive Economic Development Strategy 2015-2020, North Delta Regional Planning & Development Districts, Inc. URL: https://www.laworks.net/LaborMarketInfo/LMI_LaborForceDiversity_MSA.asp
Kingsley, Karen, Florida Parishes of Louisiana. URL: https://64parishes.org/entry/florida-parishes-of-louisiana

Gardner, Joel, Folklife in the Florida Parishes, Folklife in Louisiana. URL: https://www.louisianafolklife.org/lt/Virtual_Books/Fla_Parishes/book_florida_overview.html

Occupational Breakout of the Civilian Labor Force by Sex and Ethnic Group, Houma MSA 2019, Louisiana Workforce Commission. URL: https://www.laworks.net/LaborMarketInfo/LMI_LaborForceDiversity_MSA.asp

Delta Regional Authority https://dra.gov/about-dra/about-delta-regional-authority/

The Teche Project: URL: https://www.techeproject.org/bayou-teche-paddle-trail/history-culture/#:~:text=History%20%26%20Culture%20The%20Bayou%20Teche%20takes%20you,a%20booming%20cypress%20industry%20in%20the%20early%201900s.

Exhibit 2

Michael C. Hefner

Vitae of Reapportionment, Economic, & Demographic Work Experience

1.0 Qualifications

1.1 *Demographic, Reapportionment and Economic Development Experience*

Mike Hefner is the Chief Demographer and owner of Geographic Planning and Demographic Services, LLC. He has extensive experience working with specialized demographics, census counts from the Census Bureau and use of the Bureau's TIGER Line Files, dating back to 1990. These computer-generated map files are used to enumerate the Census as well as serving as the base map for reapportionments and other demographic uses.

Hefner served as the Economic Development Manager and later became the Assistant Director of the Evangeline Economic and Planning District from 1990-1995. Among other things, EEPD was the Census Data Center Affiliate for District 4. During that time, he served as the Census Bureau's liaison for the 8 Parish Acadiana area. He and staff from the Imperial Calcasieu Planning District were the first in the State to use the Census Bureau's TIGER Line Files and related census data on PC-based computers. He was also among the first in the State to fully computerize the functions of reapportioning based on PCs. During this time he also provided extensive assistance to other Planning and Development Districts statewide in use of the TIGER Line Files, the 1990 Census data, and reapportionment through the use of PC computers.

Hefner also provides demographic services under contract to the newly renamed Acadiana Regional Development District. His experience, combined with his familiarity of the service area of the District, provides the district with a comprehensive source of demographic and economic data.

From 1995 to 1999, Hefner served as the Executive Director of the Enterprise Center of Louisiana. In that capacity, he provided hundreds of hours of assistance to entrepreneurs starting or expanding a business. In addition, he provided economic development assistance to municipalities and parish entities throughout the eight parish Acadiana Area. He also served as President of the Louisiana Business Incubator Association.

Hefner also served on the Lafayette Parish School Board, having first been appointed to the Board in 1986 to fill the unexpired term of his father-in-law, E. Lloyd Faulk. He was elected to the Board in 1990 and re-elected in the elections of 1994, 1998, 2002 and 2006. He has served in the capacity of President and Vice President of the Board. Hefner chose not to run for re-election in 2010 due to anticipated schedule conflicts arising from 2010 redistricting projects.

1.2 Legal Qualifications

In connection with the 1990 Census, Hefner was certified as an expert witness in the United States District Court Western District of Louisiana and testified when the Evangeline Parish School Board defended a Section 2 suit brought against their reapportionment plan by a citizen of the parish. The citizen filed suit against a Parish School Board on the plan after they had adopted and received Justice Department Section 5 approval. The plan was successfully defended.

For the 2000 Census, Hefner was retained by the Attorney General of the State of Louisiana and the Department of Elections to develop alternative plans and provide expert testimony in the case of City of Baker School Board vs. State of Louisiana. The case was heard in the 19th Judicial Circuit Court and

Hefner was the sole witness presented by the State. That case was ruled in favor of the State at both the district court and the Appellate Court.

After the 2000 census redistricting the redistricting plan for St. Landry Parish School Board was challenged under Section 2 of the Voting Rights Act. Hefner served as the expert witness for the defendants. The case was resolved among the parties based on some suggested modifications by Hefner.

Hefner currently serves as an expert witness in demography and reapportionment for the Louisiana Department of Justice. Recent cases involve the method of election for the five judicial seats in the 32nd JDC in Terrebonne Parish and in the 40th JDC. Hefner's earlier work in the Terrebonne 32nd JDC case on behalf of the Louisiana Secretary of State played a large part in successfully dismissing the Secretary as a defendant in the case. Hefner is also providing expert witness services in a case concerning the minority representation in the current Louisiana Congressional Districts.

Hefner is currently certified as an Expert Witness in reapportionment and demography for the U.S. District Court Western District of Louisiana, the Middle District of Louisiana, and the 15th and 19th District Courts in Louisiana. Most recently, Hefner was reaffirmed as an expert in reapportionment and demography in the 15th Judicial District Court in the case of Keith Kishbaugh vs The City of Lafayette Government, Lafayette Parish Government, and Lafayette City-Parish Government.

Hefner completed his legal education and received his Juris Doctorate in law in January 2008. He successfully passed the California Bar exam and is a member in good standing with the California Bar.

2.0 Past Reapportionment, Economic Development, Demographic & Mediation/Facilitation Work

2.1 Reapportionment, Demography & Economic Development

After the 1990 Census, Hefner provided Technical Assistance Services to some 22 governmental entities for reapportionment. In addition, some half dozen were performed directly whereby the full scope of the reapportionment process was conducted. Much of the Technical Assistance comprised of drawing up a number of possible plans with the associated data for consultants and governmental staff working on reapportionment or providing detailed demographic data at the precinct and/or census block level.

With the release of the 2000 Census, Hefner had been primarily involved in performing analyzing population trends in connection with the reapportionment services to over 41 jurisdictions throughout Louisiana.

For the 2010 Census, Hefner successfully completed redistricting plans for over 73 jurisdictions. Hefner has also performed a number of market analyses for private companies and site location analysts.

Hefner is currently serving on a legislative committee charged with reviewing redistricting statutes. He was appointed by the Louisiana Secretary of State to represent demographers.

Additionally, population census counts, updates, and projections have been conducted for several municipal governments, water, fire, and wastewater districts. The projections have withstood state reviews and court scrutiny as well as U.S. Department of Justice review where applicable.

During his tenure at the Evangeline Economic and Planning District, Hefner provided numerous economic and site location analyses for major corporations looking to locate or expand in south central Louisiana. Nearly every municipality, water district, wastewater district, and Parish government in the 8 parish Acadiana area was the recipient of one or more demographic studies performed at their request.

In addition, Hefner performed Economic Needs Assessments for each of the 8 Parishes in the District annually and developed reports of the findings to the U.S. Department of Commerce. Many of these assessments were used to help secure millions of dollars in infrastructure grants.

2.2 School Demographic Work

In the highly specialized area of school demographics, Hefner has provided demographic services to the Lafayette Parish School Board, the St. Landry Parish School Board, the Pointe Coupee Parish School Board, the St. John the Baptist School Board, the Vermilion Parish School Board, the Bossier Parish School Board, the E. Feliciana Parish School Board, the Evangeline Parish School Board, the Union Parish School Board, the Ouachita Parish School Board, Monroe City School Board, the W. Baton Rouge Parish School Board, the DeSoto Parish School Board, the Jackson Parish School Board, the Lincoln Parish School Board, and the U.S. Department of Justice. For the Lafayette, Bossier, E. Feliciana, Vermilion, Evangeline, Union, Ouachita, Monroe City, DeSoto, W. Baton Rouge Parish School Boards as well as for the U.S. Department of Justice, much of the demographic work has concentrated on general population trends, student demographics, analyzing, and/or constructing school attendance zones in connection with their respective desegregation cases.

Recent efforts in St. Landry, Evangeline, Monroe City, Union, DeSoto, Ouachita and Bossier have centered on modification of their school attendance zones as they relate to their school facilities in order to meet the mandates of their respective desegregation litigation. Pointe Coupee was a combined project of consolidating schools, redrawing attendance zones, and a complete redesign of their bus transportation system and a complete audit of their contract bus routes. The U.S. Department of Justice project involved the student assignment plan for the Avoyelles Parish School Board and Morehouse Parish School Board.

To date the school districts in Ouachita, Evangeline, St. Landry, Avoyelles, and Morehouse Parishes have received Unitary Status based on the student assignment work conducted by Hefner. Union has recently received Unitary Status.

The use of computer GIS software has been extensively used to help with these efforts and provides the maximum opportunity to rapidly assess a number of different school district configurations or to analyze existing zones. Hefner is one of the few, if not the only one in the State currently using specialized GIS software for these educational-related activities.

2.3 Mediation/Facilitation

Hefner has extensive mediation and facilitation experience. For the Federal courts, he was one of the representatives from the School Board chosen to facilitate an agreement regarding the District's dress code and the exercise of religious customs of students attending Lafayette Parish Public Schools. A successful agreement was reached thereby avoiding a costly court hearing and trial.

Hefner also facilitated the Consent Decree response in the Alfreda Trahan v. Lafayette Parish School Board desegregation case. After the court ruling of May 19, 2002, Judge Richard Haik ordered the Board to develop a new desegregation plan within 6 weeks. Hefner was chosen by the Board President to facilitate the development of that plan. Street wisdom at that time said it would take over a year for the Board to develop a plan and one could never be developed that all parties would agree to. By bringing

all parties together from the beginning, a plan was developed within 5 weeks that all parties to the desegregation suit signed off on and the plan was later accepted by Judge Haik.

Hefner also exercised mediation and facilitation skills during many of the reapportionment projects undertaken during the past two censuses. Competing interests often came to the surface during many of the reapportionment discussions, which had to be successfully mediated in order to come reach agreement on a plan that would meet community and legal criteria. Many reapportionment projects conducted after the 2000 and 2010 censuses required mediation among elected officials as well as among some community leadership. All reapportionment projects conducted by Hefner received Section 5 approval from the U.S. Department of Justice on the first submission prior to the *Shelby* ruling.

2.4 Government Demographic, GIS, Reapportionment Projects, Expert Witness Testimony:

Acadia Parish Police Jury (reapportionment 2000, 2010, 2020 precinct mergers, 2021 prospective precincts).
Acadia Parish School Board (reapportionment 2000, 2010, 2020).
Acadia Parish Police Jury (parish wide GIS project).
Allen Parish Police Jury (reapportionment 2020).
Allen Parish School Board (reapportionment 2020).
Ascension Parish School Board (student attendance boundaries, school site selection, reapportionment 2020)
Ascension Parish Council (reapportionment 2020)
Avoyelles Parish Police Jury (reapportionment 2020).
Bossier Parish School Board (new school zones, student pop projections, school site planning).
Bossier Parish School Board (grade realignments/school zone modification project).
Bossier Parish School Board (school desegregation expert witness services).
Bossier Parish School Board (reapportionment 2010, 2020).
Bossier Parish Police Jury (reapportionment 2020).
Cameron Parish School Board (Reapportionment 2010).
Central Community School System (5/10 Year student projection report, reapportionment 2020)
DeSoto Parish Police Jury (Precinct mergers and consolidations, 2021 prospective precincts, 2020 redistricting).
DeSoto Parish School Board (desegregation plan review, student projections, plan modification, USDoJ plan review, expert witness services, 2020 redistricting).
East Baton Rouge Parish School Board (Five-year student projection reports 2017, 2018, redistricting 2020).
East Baton Rouge Metro Council (redistricting 2020).
Evangeline Parish Police Jury (reapportionment 2000, 2010, 2020, Census update, precinct mergers).
Evangeline Parish School Board (reapportionment 1990, 2000, 2010, 2020).
Evangeline Parish School Board (School Consolidations, student projections, student assignment plans, and expert witness services).
E. Feliciana Parish Police Jury (Precinct realignments, 2021 Prospective Precincts, 2020 redistricting).
E. Feliciana Parish School Board (change in board composition, 12-year student population projections, 2020 redistricting).
Lafayette Parish School Board/Consolidated Council (TA) (reapportionment 2000, 2010, 2020).
Lafayette Parish School Board (30-year study of Parish demographic shifts by race, comprehensive student assignment plan, five-year student projection report).
Lafayette Consolidate Government (City of Lafayette & Lafayette Parish council reapportionments for charter revision, expert witness testimony).

Livingston Parish Police Jury (precinct realignments).
Iberia Parish HRC Council (reapportionment 1990, 2000, 2010, 2020, precinct mergers, 2021 prospective precincts).
Iberia Parish School Board (reapportionment 2000, 2010, 2020).
Iberia Parish School Board (student assignment plan 2018, 2019).
Iberia Parish HRC Council (Membership reduction plans).
Iberville Parish Police Jury (precinct realignments).
Jackson Parish School Board (student assignment plans, basic student projection report, expert witness services).
Madison Parish (Precinct realignments).
Monroe City School Board (Student projections and Zone Alignments 2010-2012, 2020, 2022).
Ouachita Parish School Board (Unitary Status *Green* factor review and expert witness services).
Plaquemine Parish Police Jury (precinct realignments).
Pointe Coupee Parish Police Jury (election districts for new Home Rule Charter implementation, precinct mergers, 2021 prospective precincts, 2020 redistricting).
Pointe Coupee Parish School Board (reapportionment 2000, 2010, 2020).
Pointe Coupee Parish School Board (transportation routing/school consolidation/zone boundary changes, bus audits).
Richland Parish School Board (student assignment plans).
St. Bernard Parish Government (residential housing study)
St. John the Baptist School Board (5/10 year student census projections).
St. Landry Parish Police Jury (reapportionment 2000, 2010 for new Home Rule Charter, 2020 redistricting).
St. Landry Parish Council (precinct realignments, Census LUCA updates, precinct mergers, 2021 prospective precincts).
St. Landry Parish School Board (reapportionment 2000, 2010, 2020).
St. Landry Parish School Board (student assignment plans, bus transportation plan, student population projection report, expert witness services).
St. James Parish School Board (student assignment, school attendance boundaries, 5-Year projection report, reapportionment 2010, 2020).
St. James Parish Council (Housing study).
St. John the Baptist Parish School Board (10-year student projection report)
St. Martin Parish HRC Council (reapportionment 2000, 2010, 2020).
St. Martin Parish School Board (reapportionment 2000, 2010, 2020).
St. Martin Parish School Board (2016 student assignment plans, expert witness services).
St. Martin Parish HRC Government (parish wide GIS project, Census LUCA updates).
St. Martin Parish Government (precinct realignments and mergers, 2021 prospective precincts).
St. Mary Parish HRC Council (reapportionment 2000 and 2010).
St. Mary Parish HRC Council (precinct realignments).
St. Mary Parish School Board (2010, 2020 reapportionment, student assignment plans, expert witness services).
State of Louisiana-Secretary of State (alternative reapportionment plans, demographic and reapportionment expert witness services).
State of Louisiana-Louisiana Department of Justice (32nd JDC, 40JDC demographic and reapportionment expert witness services.)
Tangipahoa Parish School Board (5/10 Year Student Projection Report).
City of Scott (reapportionment 1990, 2000, 2010, 2020 Census LUCA update).
City of Eunice (reapportionment 1990, 2000, 2010, 2020).

City of Broussard (reapportionment 2000, 2010, 2020).
City of Broussard (50-year population study).
City of Breaux Bridge (reapportionment 2010, 2020).
City of Crowley (reapportionment 1990, 2000, 2010, 2020).
City of Donaldsonville (reapportionment 2020).
City of Marksville (reapportionment 2010, 2020).
City of Rayne (reapportionment 2000, 2010, 2020).
City of Church Point (reapportionment 2000, 2010, 2020).
City of Opelousas (reapportionment 2010, 2020).
City of Central (reapportionment 2020).
City of Ville Platte (reapportionment 2010, 2020).
City of Zachary (2010, 2020 reapportionment).
Town of Sunset (reapportionment 2000, 2010, 2020).
Town of Mamou (reapportionment 2000, 2010, 2020).
Town of Washington (reapportionment 2000, 2010, 2020).
Town of Bunkie (reapportionment 2000, 2010, 2020).
Town of Cottonport (reapportionment 2000, 2010, 2020).
Town of Kinder (reapportionment 2000, 2010, 2020).
Town of Tallulah (reapportionment 2000).
Town of Springhill (reapportionment 2010, 2020).
Town of St. Francisville (reapportionment 2020).
Tucson Independent School District No. 1, Tucson AZ (Desegregation Initiatives and Review).
City of Youngsville (census update 2004, 2014, reclassification as a City in 2004, 30-Year Demographic Projection).
Union Parish School Board (student assignment plan for Union Parish Deseg case, expert witness services).
U.S. Department of Justice (student assignment plan for Avoyelles Parish Schools, expert witness services).
U.S. Department of Justice (student assignment plan review for Morehouse Parish, expert witness services).
Vermilion Parish School Board (school rezoning, parish-wide street and address updates, student population projection report, 2020).
Vermilion Parish School Board (reapportionment 2000, 2010, 2020).
Webster Parish School Board (school attendance plan, expert witness services).
W. Feliciana Parish HRC Council (Precinct mergers, 2021 prospective precincts, redistricting 2020).
W. Feliciana Parish Police Jury (redistricting plan for Home Rule Charter compliance).
W. Feliciana Parish School Board (Twelve-year student projection report 2018, Report Update 2019).
W. Baton Rouge Parish School Board (5-year student projection, redistricting 2010, 2020)
Winona-Montgomery Consolidated School District (School desegregation-Transportation bus route analysis).

1990 Census Reapportionments:

City of Crowley
City of Scott
City of Eunice
Evangeline Parish School Board
Iberia Parish Council (TA)

Several Private Consultants *(primarily city engineers doing redistricting plans)*
Vermilion Parish Police Jury (TA)
Lafayette Parish School Board (TA)
Town of Ville Platte (TA)
City of Breaux Bridge (TA)
Town of St. Martinville (TA)

3.0 Educational Background

- Graduated from Concord Law School earning a Juris Doctorate in law. Successfully passed the February 2008 administration of the California Bar exam. Member of the California Bar, Bar #257492.
- Commissioned as a Louisiana Notary Public, May 2015.
- Completed Public Service course sessions at the Leadership Institute, Greensboro, NC March 1993
- Graduated from the Basic Economic Development Course, University of Kansas, 1992
- Completed Leadership Lafayette, Class II, 1987
- Graduated from University of Southwestern Louisiana 1978, Degree in Business Administration, Marketing
- Graduated from Our Lady of Fatima High School, 1974

4.0 Community Leadership

- Member of the Lafayette Parish School Board, District 5, 1986, 1990 to 2010. Did not seek reelection due to meeting conflicts anticipated with redistricting.
- Past Chairman and director on the Board of Directors for Goodwill Industries.
- Director CADENCE non-profit board.
- Past Chairman of the Lafayette Parish Industrial Development Board
- Past Chairman of the Louisiana Business Incubation Association
- Past Chairman Citizens for Public Education
- One of the charter founders of the Lafayette Public Education Foundation, past member.

5.0 Contact Information:

Mike Hefner
Chief Demographer
Geographic Planning and Demographic Services, LLC
905 Golden Grain Rd.
Duson, LA 70529
(337) 873-4244 (Home Office)
(337) 739-4499 (cell/text)
mhefner@cox.net

Cal. Bar #257492

EXHIBIT D

EXPERT REPORT OF JOHN R. ALFORD, Ph.D.

Scope of Inquiry

I have been retained by Office of the Attorney General of the State of Louisiana on behalf of the Secretary of State of Louisiana, as an expert to provide analysis related to the evidence of racially polarized voting in the joined cases *Robinson, et al v. Ardoin*, and *Galmon, Sr., et al v. Ardoin*, challenging the most recently adopted Congressional maps for Louisiana. I have examined the reports provided by plaintiffs' experts Dr. Lisa Handley and Dr. Maxwell Palmer in this case. My rate of compensation in this matter is $500 per hour.

Qualifications

I am a tenured full professor of political science at Rice University. In my over thirty years at Rice I have taught courses on redistricting, elections, political representation, voting behavior and statistical methods at both the undergraduate and graduate level. I am the author of numerous scholarly works on political behavior. These works have appeared in academic journals such as the *American Journal of Political Science*, *Journal of Politics*, *Science*, *Annual Review of Political Science*, *Legislative Studies Quarterly*, *Annals of the American Academy of Political and Social Science*, *Political Psychology*, and *Political Research Quarterly*.

Over the last thirty years, I have worked with numerous local governments on districting plans and on Voting Rights Act issues. I have previously provided expert reports and/or testified as an expert witness in voting rights and statistical issues in a variety of court cases in Louisiana,

New Mexico, Mississippi, Wisconsin, Florida, Georgia, Michigan, New York, Arkansas, Pennsylvania and Alabama. The details of my academic background, including all publications in the last ten years, and work as an expert, including all cases in which I have testified by deposition or at trial in the last four years, are covered in the attached CV (Appendix 1).

Data and Sources

In preparing my report, I have reviewed the reports filed by the plaintiffs' experts Dr. Lisa Handley and Dr. Maxwell Palmer. I have also relied for my report on the analysis, the associate documentation, and the data provided to date by Drs. Handley and Palmer, as well as Louisiana election data publicly available on the elections website of the Louisiana Secretary of State.

Election Analysis

I began my analysis with an attempt to replicate selected results of the Ecological Inference (EI) analysis provided by Dr. Handley and Dr. Palmer in their reports in this case. To do so I relied on the data they in producing their Ecological Inference estimates for the elections included in their reports. The replication results for selected elections matched very closely the estimates reported by Dr. Handley and Dr. Palmer, with only the slight variation that one would expect given the inherent variation associated with Ecological Inference estimations. Further, a comparison of the reported EI results for the substantial set of elections that were included by both Dr. Handley and Dr. Palmer, also show only slight variations that do not alter the substantive conclusions one might draw from any of the elections analyzed. Given that there were no substantive differences

across the reported results or the replication results, and to make it clear that where I disagree with Dr. Handley or Dr. Palmer it is not on the basis of any difference in the numerical results of our analysis, I have relied for this report entirely on the Ecological Inference estimates provided by Dr. Handley and Dr. Palmer in their reports.

Presidential Elections

In Table 1 below, I report the results for the three presidential elections covered in Dr. Palmer's report and extracted from his Table 2 on page 9 of his report, with the EI estimates reported by Dr. Handley for 2020 (the only presidential election covered in her report) in Appendix A of her report added in. For an overview of voter polarization, November presidential elections are a good place to start. These elections are typically competitive, the same two candidates compete in every precinct, and the analysis is not affected by local voting effects where votes for one candidate might be boosted by 'friends and neighbors voting'.

Table 1: Presidential Election EI Results

				RxC est. Black Voters		RxC est. white Voters	
Year	Office	Candidate		Palmer	Handley Black	Palmer	Handley White
2012	U.S. President	Obama (D)	B	**91.6%** (86.5, 95.0)		**14.9%** (13.3, 17.3)	
		Romney (R)	W	7.5% (4.2, 12.4)		84.2% (81.8, 85.7)	
2016	U.S. President	Clinton (D)	W	**97.5%** (95.0, 98.5)		**13.1%** (12.7, 14.1)	
		Trump (R)	W	1.6% (0.8, 3.6)		85.1% (84.2, 85.5)	
2020	U.S. President	Biden (D)	W/B	**89.3%** (84.8, 92.4)	**86.6%** (72.0, 92.9)	**17.1%** (15.4, 19.5)	**18.4%** (14.8, 26.7)
		Trump (R)	W/W	9.3% (6.3, 13.7)	12% (5.9, 26.2)	82.2% (79.8, 84.0)	80.9% (72.5, 84.5)

The general pattern of voter support in these three contests is very similar to what the remaining two-party contested elections in Dr. Palmer's Table 2 and Dr. Handley's Appendix B show, with Black voters providing an estimated level of support for the Democratic candidate in the low to mid 90% range, while White voters provide an estimated level of support for the

Democratic candidate in the teens to low 20% range. Both Dr. Handley and Dr. Palmer treat results of this sort as clear evidence of racially polarized voting, but these three contests provide clear insight into whether the reported results show anything more than partisan polarization.

The 2012 contest features a Black Democrat running against a White Republican. The 2020 contest represents an intermediate type, which Dr. Handley includes in her analysis of racially contested elections because, while the presidential candidates are both White, the Democratic vice presidential candidate, Kamala Harris, is Black. The 2016 contest completes the pattern, with a White Democrat running against a White Republican. If the race of candidates is a focus for Black voters then we would expect a clear ordering with Black voter support highest for the 2012 Obama/Biden ticket, lowest for the 2016 Clinton/Kaine ticket, and somewhere in between for the 2020 Biden/Harris ticket. Similarly, if the race of candidates is a focus for White voters, then we would expect White voter support to follow the reverse ordering with White support for the 2016 Clinton/Kaine ticket the highest and White support for 2012 Obama/Biden ticket the lowest.

Looking first at the estimates for Black voters we can see that while in all three elections the Democratic ticket gets a similarly high level of support, there some modest variation. However, the variation is not in the expected pattern. Instead, the highest estimate for Black support at 97.5% is for the all-White ticket of Clinton/Kaine, with Black support for Obama/Biden at 91.6 and for Biden/Harris at 89.3%. Turning to White voters, the lowest estimated support at 13.1% is for the all-White 2016 Clinton/Kaine ticket, followed by 14.9% for the 2012 Obama/Biden ticket, and the highest estimate of White support for the Democratic ticket is 17.1% for the 2020 Biden/Harris ticket. In short, Black and White voters do appear to offer very different

levels of support to Democratic and Republican candidates, but these levels of support do not appear to be a function of the race of the candidate in these two-party contested presidential elections.

Republican versus Republican Contests

A second set of elections that provides direct insight into the roles of race and party in Louisiana elections are the three contests in which both candidates are Republicans. The voting patterns in these contests is highly distinct relative to the two-party contested presidential contests in Table 1, and the remaining statewide contests that are also two-party contested. Dr. Palmer summarizes the more typical pattern nicely when he states that "across the 18 Black candidates of choice, the average candidate received an estimated 91.4% of the vote from Black voters, and 20.8% of the vote from White voters" (page 4). Similarly, Dr. Handley summarizes the typical pattern as one "with Black voters' support averaging 93.5% for the Black-preferred candidates" compared to White voter support at "14.1% when contests with only two candidates are considered" (page 8).

Table 2: Republican versus Republican Statewide Elections

				RxC est. Black Voters	RxC est. white Voters
Year	Office	Candidate		Palmer	Palmer
2015	Attorney General	Caldwell (R)	W	58.9% (58.5, 59.4)	36.5% (36.2, 36.8)
		Landry (R)	W	41.1% (40.6, 41.5)	63.5% (63.2, 63.8)
2015	Treasurer	Kennedy (R)	W	74.5% (74.2, 74.8)	83.2% (82.9, 83.4)
		Treadway (R)	W	25.5% (25.2, 25.8)	16.8% (16.6, 17.1)
2019	Comm. Insurance	Donelon (R)	W	53.7% (53.3, 54.2)	54.5% (54.2, 54.8)
		Temple (R)	W	46.3% (45.8, 46.7)	45.5% (45.2, 45.8)

As a glance at Table 2 clearly shows, the typical pattern of 90% plus Black support for one candidate, contrasted with 20% or less White support for the same candidate is not evident in these elections at all. Once there is not a Democratic candidate, the pattern of racial differences in voting largely disappears. In the 2019 Commissioner of Insurance contest both Black and White voters are almost evenly divided, with a slight majority favoring the winning candidate Donelon by almost identical margins (53.7 versus 54.5). In the 2015 Treasurer's contest the result is more lopsided in favor of the winning candidate Kennedy, but again the levels of support for Kennedy among Black and White voters is very similar (74.5% versus 83.3%). In the remaining Republican versus Republican contest for Attorney General in 2015 the voting patterns are again very different from the typical pattern, but here the modest preference of Black voters is Caldwell at 58.9% while the preference of White voters is Landry at 63.5%. Even this modest difference is likely related to party. Caldwell was first elected to the office as a Democrat. He switched to the Republican Party in 2011 and was elected that same year as a Republican in an unopposed contest. In 2015, with a Republican opponent that had been a Republican throughout his political career, Caldwell was defeated in the runoff despite being the incumbent.

Other Statewide Elections

EI estimates of racial voting patterns for nine election contests are included in both Dr. Handley's report and Dr. Palmer's report. This is a subset of the full set of elections in Dr. Palmer's report, because Dr. Handley restricts her analysis to only racially contested elections, but the fact that the contests are in both reports provides an opportunity to assess the impact, if any, of differences in data and analysis techniques between these independent looks at voting patterns in these elections. Looking down the columns of estimates for both Black and White voters it is clear

that while there are very modest differences in the point estimates, the results are very similar and can be used interchangeably to reach the same conclusions.

Table 3: Statewide Elections in both the Handley and Palmer Reports

				RxC est. Black Voters		RxC est. white Voters	
Year	Office	Candidate		Palmer	Handley	Palmer	Handley
2015	Lt. Governor*	Holden (D)	B	96.1% (95.9, 96.4)	96.2%	20.4% (20.2, 20.7)	20.5%
		Nungesser (R)	W	3.9% (3.6, 4.1)	3.8%	79.6% (79.3, 79.8)	79.5%
2015	Sec. State	Tyson (D)	B	93.5% (93.2, 93.8)	93.5%	14.1% (14.0, 14.3)	14.2%
		Schedler (R)	W	6.5% (6.2, 6.8)	6.5%	85.9% (85.7, 86.0)	85.8%
2017	Treasurer*	Edwards (D)	B	98.4% (98.2, 98.6)	98.5%	18.7% (18.5, 18.8)	18.7%
		Schroder (R)	W	1.6% (1.4, 1.8)	1.5%	81.3% (81.2, 81.5)	81.3%
2018	Sec. State*	Collins-Greenup (D)	B	96.8% (96.6, 97.0)	96.8%	14.0% (13.8, 14.1)	14.0%
		Ardoin (R)	W	3.2% (3.0, 3.4)	3.2%	86.0% (85.9, 86.2)	86.0%
2019	Attorney General	Jackson (D)	B	90.5% (90.2, 90.8)	90.6%	9.4% (9.3, 9.5)	9.4%
		Landry (R)	W	9.5% (9.2, 9.8)	9.4%	90.6% (90.5, 90.7)	90.6%
2019	Lt. Governor	Jones (D)	B	88.4% (88.1, 88.7)	88.6%	7.6% (7.5, 7.7)	7.6%
		Nungesser (R)	W	11.6% (11.3, 11.9)	11.5%	92.4% (92.3, 92.5)	92.4%
2019	Sec. State*	Collins-Greenup (D)	B	96.1% (95.8, 96.3)	96.1%	12.9% (12.7, 13.0)	12.9%
		Ardoin (R)	W	3.9% (3.7, 4.2)	3.9%	87.1% (87.0, 87.3)	87.1%
2019	Treasurer	Edwards (D)	B	94.7% (94.5, 95.0)	94.6%	11.0% (10.8, 11.2)	11.2%
		Schroder (R)	W	1.9% (1.7, 2.1)	2.1%	84.9% (84.8, 85.0)	84.7%
2020	U.S. Senator	Edwards (D)	B	29.4% (29.1, 29.7)	30.0%	1.9% (1.8, 2.0)	2.0%
		Perkins (D)	B	48.7% (48.4, 49.1)	49.8%	6.8% (6.6, 7.1)	6.9%
		Combined Dem.	B	78.1%	79.8%	8.7%	8.9%
		Cassidy (R)	W	4.4% (4.2, 4.7)	4.7%	85.8% (85.7, 85.9)	87.0%

While all nine of the contests in Table 3 feature a Black candidate(s) that is also a Democrat, there are an additional seven statewide two-party contested elections that do not include a Black candidate and that were included in Dr. Palmer's more inclusive set of statewide election reported in his Table 2 (page 9). These contests provide a highly useful comparison to the racially contested elections from both reports included above in Table 3 as these elections retain the characteristic of being two-part contested, but are not racially contested.

Table 4: Statewide Election included only in Dr. Palmer's Report

				RxC est. Black Voters	RxC est. white Voters
Year	Office	Candidate		Palmer	Palmer
2014	U.S. Senator*	Landrieu (D)	W	99.3% (99.2, 99.4)	16.8% (16 7, 17 0)
		Cassidy (R)	W	0 7% (0.6, 0.8)	83.2% (83 0, 83 3)
2015	Comm. Agriculture	Greer (D)	W	82.2% (81.9, 82.5)	10.0% (9.8, 10.2)
		Strain (R)	W	12.0% (11.7, 12.3)	77.7% (77 6, 77 8)
2015	Comm. Insurance	Hodge (D)	W	34.9% (34.5, 35.2)	4.8% (4.6, 5.0)
		McGehee (D)	W	48.9% (48.6, 49.3)	6.5% (6.3, 6.6)
		Donelon (R)	W	13.9% (13.6, 14.2)	69.8% (69 6, 70 0)
		Parker (R)	W	2 3% (2.2, 2.4)	18.9% (18 8, 19 0)
		Combined Dem.	W	83.8%	11.3%
		Combined Rep.	W	16.2%	88.7%
2015	Governor*	Edwards (D)	W	99.2% (99.1, 99.3)	34.8% (34 7, 34.9)
		Vitter (R)	W	0 8% (0.7, 0.9)	65.2% (65.1, 65 3)
2016	U.S. Senator*	Campbell (D)	W	98.8% (98.7, 99.0)	13.8% (13 7, 13.9)
		Kennedy (R)	W	1 2% (1.0, 1.3)	86.2% (86.1, 86 3)
2019	Comm. Agriculture	Green (D)	W	51.4% (51.1, 51.8)	5.8% (5.6, 5.9)
		Strain (R)	W	6 8% (6.5, 7.1)	78.0% (77 8, 78.1)
2019	Governor*	Edwards (D)	W	99.3% (99.2, 99.4)	26.5% (26.4, 26 7)
		Rispone (R)	W	0 7% (0.6, 0.8)	73.5% (73 3, 73 6)

The overall pattern in the election contests in Table 4 are remarkable similar to the pattern in the election contests in Table 3. That is, taken together the two Tables illustrate that the tendency of Black voters to vote at high levels for Democratic candidates is not dependent on those Democratic candidates themselves being Black or White, only that they are Democrats. Similarly, the tendency of White voters to vote at low levels for Democratic candidates is not dependent on those Democratic candidates themselves being Black or White, only that they are Democrats.

Congressional Elections

In Appendix B of her report Dr. Handley also provides EI estimates for voting patterns in endogenous congressional elections in CD 2, CD 3, CD 4, CD 5, and CD 6. Outside of CD 2, the

broad patterns are similar to those for statewide elections with Black voters supporting Democratic candidates and White voters supporting Republican candidates. In CD 2, Black voters again support the Democratic candidate(s), while White voters are more evenly divided between the Democratic and Republican candidates.

Summary Conclusions

White Democratic candidates draw cohesive support from Black voters just as Black Democratic candidates do. Likewise, Black Democratic candidates draw little support from White voters, just as White Democratic candidates do. The voting may be correlated with race, but whatever accounts for the correlation, the differential response of voters of different races to the race of the candidate is not the cause. As noted above, it appears that political party cohesion among Black voters in Louisiana is high for Democratic Party candidates, and remains high regardless of whether the candidate is White or Black. Similarly, party cohesion among White voters in Louisiana is high for Republican Party candidates, and remains high regardless of whether the Democratic candidate is White or Black.

April 29, 2020

John R. Alford, Ph.D.

Appendix 1

John R. Alford

Curriculum Vitae
April, 2022

Dept. of Political Science
Rice University - MS-24
P.O. Box 1892
Houston, Texas 77251-1892
713-348-3364
jra@rice.edu

Employment:

Full Professor, Rice University, 2015 to present.
Associate Professor, Rice University, 1985-2015.
Assistant Professor, University of Georgia, 1981-1985.
Instructor, Oakland University, 1980-1981.
Teaching-Research Fellow, University of Iowa, 1977-1980.
Research Associate, Institute for Urban Studies, Houston, Texas, 1976-1977.

Education:

Ph.D., University of Iowa, Political Science, 1981.
M.A., University of Iowa, Political Science, 1980.
M.P.A., University of Houston, Public Administration, 1977.
B.S., University of Houston, Political Science, 1975.

Books:

Predisposed: Liberals, Conservatives, and the Biology of Political Differences. New York: Routledge, 2013. Co-authors, John R. Hibbing and Kevin B. Smith.

Articles:

"Political Orientations Vary with Detection of Androstenone," with Amanda Friesen, Michael Gruszczynski, and Kevin B. Smith. **Politics and the Life Sciences**. (Spring, 2020).

"Intuitive ethics and political orientations: Testing moral foundations as a theory of political ideology." with Kevin Smith, John Hibbing, Nicholas Martin, and Peter Hatemi. **American Journal of Political Science**. (April, 2017).

"The Genetic and Environmental Foundations of Political, Psychological, Social, and Economic Behaviors: A Panel Study of Twins and Families." with Peter Hatemi, Kevin Smith, and John Hibbing. **Twin Research and Human Genetics**. (May, 2015.)

"Liberals and conservatives: Non-convertible currencies." with John R. Hibbing and Kevin B. Smith. **Behavioral and Brain Sciences** (January, 2015).

"Non-Political Images Evoke Neural Predictors Of Political Ideology." with Woo-Young Ahn, Kenneth T. Kishida, Xiaosi Gu, Terry Lohrenz, Ann Harvey, Kevin Smith, Gideon Yaffe, John Hibbing, Peter Dayan, P. Read Montague. **Current Biology**. (November, 2014).

"Cortisol and Politics: Variance in Voting Behavior is Predicted by Baseline Cortisol Levels." with Jeffrey French, Kevin Smith, Adam Guck, Andrew Birnie, and John Hibbing. **Physiology & Behavior**. (June, 2014).

"Differences in Negativity Bias Underlie Variations in Political Ideology." with Kevin B. Smith and John R. Hibbing. **Behavioral and Brain Sciences**. (June, 2014).

"Negativity bias and political preferences: A response to commentators Response." with Kevin B. Smith and John R. Hibbing. **Behavioral and Brain Sciences**. (June, 2014).

"Genetic and Environmental Transmission of Political Orientations." with Carolyn L. Funk, Matthew Hibbing, Kevin B. Smith, Nicholas R. Eaton, Robert F. Krueger, Lindon J. Eaves, John R. Hibbing. **Political Psychology**, (December, 2013).

"Biology, Ideology, and Epistemology: How Do We Know Political Attitudes Are Inherited and Why Should We Care?" with Kevin Smith, Peter K. Hatemi, Lindon J. Eaves, Carolyn Funk, and John R. Hibbing. **American Journal of Political Science**. (January, 2012)

"Disgust Sensitivity and the Neurophysiology of Left-Right Political Orientations." with Kevin Smith, John Hibbing, Douglas Oxley, and Matthew Hibbing, **PlosONE**, (October, 2011).

"Linking Genetics and Political Attitudes: Re-Conceptualizing Political Ideology." with Kevin Smith, John Hibbing, Douglas Oxley, and Matthew Hibbing, **Political Psychology**, (June, 2011).

"The Politics of Mate Choice." with Peter Hatemi, John R. Hibbing, Nicholas Martin and Lindon Eaves, **Journal of Politics**, (March, 2011).

"Not by Twins Alone: Using the Extended Twin Family Design to Investigate the Genetic Basis of Political Beliefs" with Peter Hatemi, John Hibbing, Sarah Medland, Matthew Keller, Kevin Smith, Nicholas Martin, and Lindon Eaves, **American Journal of Political Science**, (July, 2010).

"The Ultimate Source of Political Opinions: Genes and the Environment" with John R. Hibbing in **Understanding Public Opinion**, 3rd Edition eds. Barbara Norrander and Clyde Wilcox, Washington D.C.: CQ Press, (2010).

"Is There a 'Party' in your Genes" with Peter Hatemi, John R. Hibbing, Nicholas Martin and Lindon Eaves, **Political Research Quarterly**, (September, 2009).

"Twin Studies, Molecular Genetics, Politics, and Tolerance: A Response to Beckwith and Morris" with John R. Hibbing and Cary Funk, **Perspectives on Politics**, (December, 2008). This is a solicited response to a critique of our 2005 APSR article "Are Political Orientations Genetically Transmitted?"

"Political Attitudes Vary with Physiological Traits" with Douglas R. Oxley, Kevin B. Smith, Matthew V. Hibbing, Jennifer L. Miller, Mario Scalora, Peter K. Hatemi, and John R. Hibbing, **Science**, (September 19, 2008).

"The New Empirical Biopolitics" with John R. Hibbing, **Annual Review of Political Science**, (June, 2008).

"Beyond Liberals and Conservatives to Political Genotypes and Phenotypes" with John R. Hibbing and Cary Funk, **Perspectives on Politics**, (June, 2008). This is a solicited response to a critique of our 2005 APSR article "Are Political Orientations Genetically Transmitted?"

"Personal, Interpersonal, and Political Temperaments" with John R. Hibbing, **Annals of the American Academy of Political and Social Science**, (November, 2007).

"Is Politics in our Genes?" with John R. Hibbing, **Tidsskriftet Politik**, (February, 2007).

"Biology and Rational Choice" with John R. Hibbing, **The Political Economist**, (Fall, 2005)

"Are Political Orientations Genetically Transmitted?" with John R. Hibbing and Carolyn Funk, **American Political Science Review**, (May, 2005). (The main findings table from this article has been reprinted in two college level text books - Psychology, 9th ed. and Invitation to Psychology 4th ed. both by Wade and Tavris, Prentice Hall, 2007).

"The Origin of Politics: An Evolutionary Theory of Political Behavior" with John R. Hibbing, **Perspectives on Politics**, (December, 2004).

"Accepting Authoritative Decisions: Humans as Wary Cooperators" with John R. Hibbing, **American Journal of Political Science**, (January, 2004).

"Electoral Convergence of the Two Houses of Congress" with John R. Hibbing, in **The Exceptional Senate**, ed. Bruce Oppenheimer, Columbus: Ohio State University Press, (2002).

"We're All in this Together: The Decline of Trust in Government, 1958-1996." in **What is it About Government that Americans Dislike?**, eds. John Hibbing and Beth Theiss-Morse, Cambridge: Cambridge University Press, (2001).

"The 2000 Census and the New Redistricting," **Texas State Bar Association School Law Section Newsletter**, (July, 2000).

"Overdraft: The Political Cost of Congressional Malfeasance" with Holly Teeters, Dan Ward, and Rick Wilson, **Journal of Politics** (August, 1994).

"Personal and Partisan Advantage in U.S. Congressional Elections, 1846-1990" with David W. Brady, in **Congress Reconsidered** 5th edition, eds. Larry Dodd and Bruce Oppenheimer, CQ Press, (1993).

"The 1990 Congressional Election Results and the Fallacy that They Embodied an Anti-Incumbent Mood" with John R. Hibbing, **PS** 25 (June, 1992).

"Constituency Population and Representation in the United States Senate" with John R. Hibbing. **Legislative Studies Quarterly**, (November, 1990).

"Editors' Introduction: Electing the U.S. Senate" with Bruce I. Oppenheimer. **Legislative Studies Quarterly**, (November, 1990).

"Personal and Partisan Advantage in U.S. Congressional Elections, 1846-1990" with David W. Brady, in **Congress Reconsidered** 4th edition, eds. Larry Dodd and Bruce Oppenheimer, CQ Press, (1988). Reprinted in The Congress of the United States, 1789-1989, ed. Joel Silby, Carlson Publishing Inc., (1991), and in The Quest for Office, eds. Wayne and Wilcox, St. Martins Press, (1991).

"Can Government Regulate Fertility? An Assessment of Pro-natalist Policy in Eastern Europe" with Jerome Legge. **The Western Political Quarterly** (December, 1986).

"Partisanship and Voting" with James Campbell, Mary Munro, and Bruce Campbell, in **Research in Micropolitics. Volume 1 - Voting Behavior**. Samuel Long, ed. JAI Press, (1986).

"Economic Conditions and Individual Vote in the Federal Republic of Germany" with Jerome S. Legge. **Journal of Politics** (November, 1984).

"Television Markets and Congressional Elections" with James Campbell and Keith Henry. **Legislative Studies Quarterly** (November, 1984).

"Economic Conditions and the Forgotten Side of Congress: A Foray into U.S. Senate Elections" with John R. Hibbing, **British Journal of Political Science** (October, 1982).

"Increased Incumbency Advantage in the House" with John R. Hibbing, **Journal of Politics** (November, 1981). Reprinted in The Congress of the United States, 1789-1989, Carlson Publishing Inc., (1991).

"The Electoral Impact of Economic Conditions: Who is Held Responsible?" with John R. Hibbing, **American Journal of Political Science** (August, 1981).

"Comment on Increased Incumbency Advantage" with John R. Hibbing, Refereed communication: **American Political Science Review** (March, 1981).

"Can Government Regulate Safety? The Coal Mine Example" with Michael Lewis-Beck, **American Political Science Review** (September, 1980).

Awards and Honors:

CQ Press Award - 1988, honoring the outstanding paper in legislative politics presented at the 1987 Annual Meeting of the American Political Science Association. Awarded for "The Demise of the Upper House and the Rise of the Senate: Electoral Responsiveness in the United States Senate" with John Hibbing.

Research Grants:

National Science Foundation, 2009-2011, "Identifying the Biological Influences on Political Temperaments", with John Hibbing, Kevin Smith, Kim Espy, Nicolas Martin and Read Montague. This is a collaborative project involving Rice, University of Nebraska, Baylor College of Medicine, and Queensland Institute for Medical Research.

National Science Foundation, 2007-2010, "Genes and Politics: Providing the Necessary Data", with John Hibbing, Kevin Smith, and Lindon Eaves. This is a collaborative project involving Rice, University of Nebraska, Virginia Commonwealth University, and the University of Minnesota.

National Science Foundation, 2007-2010, "Investigating the Genetic Basis of Economic Behavior", with John Hibbing and Kevin Smith. This is a collaborative project involving Rice, University of Nebraska, Virginia Commonwealth University, and the Queensland Institute of Medical Research.

Rice University Faculty Initiatives Fund, 2007-2009, "The Biological Substrates of Political Behavior". This is in assistance of a collaborative project involving Rice, Baylor College of Medicine, Queensland Institute of Medical Research, University of Nebraska, Virginia Commonwealth University, and the University of Minnesota.

National Science Foundation, 2004-2006, "Decision-Making on Behalf of Others", with John Hibbing. This is a collaborative project involving Rice and the University of Nebraska.

National Science Foundation, 2001-2002, dissertation grant for Kevin Arceneaux, "Doctoral Dissertation Research in Political Science: Voting Behavior in the Context of U.S. Federalism."

National Science Foundation, 2000-2001, dissertation grant for Stacy Ulbig, "Doctoral Dissertation Research in Political Science: Sub-national Contextual Influences on Political Trust."

National Science Foundation, 1999-2000, dissertation grant for Richard Engstrom, "Doctoral Dissertation Research in Political Science: Electoral District Structure and Political Behavior."

Rice University Research Grant, 1985, Recent Trends in British Parliamentary Elections.

Faculty Research Grants Program, University of Georgia, Summer, 1982. Impact of Media Structure on Congressional Elections, with James Campbell.

Papers Presented:

"The Physiological Basis of Political Temperaments" 6th European Consortium for Political Research General Conference, Reykjavik, Iceland (2011), with Kevin Smith, and John Hibbing.

"Identifying the Biological Influences on Political Temperaments" National Science Foundation Annual Human Social Dynamics Meeting (2010), with John Hibbing, Kimberly Espy, Nicholas Martin, Read Montague, and Kevin B. Smith.

"Political Orientations May Be Related to Detection of the Odor of Androstenone" Annual meeting of the Midwest Political Science Association, Chicago, IL (2010), with Kevin Smith, Amanda Balzer, Michael Gruszczynski, Carly M. Jacobs, and John Hibbing.

"Toward a Modern View of Political Man: Genetic and Environmental Transmission of Political Orientations from Attitude Intensity to Political Participation" Annual meeting of the American Political Science Association, Washington, DC (2010), with Carolyn Funk, Kevin Smith, and John Hibbing.

"Genetic and Environmental Transmission of Political Involvement from Attitude Intensity to Political Participation" Annual meeting of the International Society for Political Psychology, San Francisco, CA (2010), with Carolyn Funk, Kevin Smith, and John Hibbing.

"Are Violations of the EEA Relevant to Political Attitudes and Behaviors?" Annual meeting of the Midwest Political Science Association, Chicago, IL (2010), with Kevin Smith, and John Hibbing.

"The Neural Basis of Representation" Annual meeting of the American Political Science Association, Toronto, Canada (2009), with John Hibbing.

"Genetic and Environmental Transmission of Value Orientations" Annual meeting of the American Political Science Association, Toronto, Canada (2009), with Carolyn Funk, Kevin Smith, Matthew Hibbing, Pete Hatemi, Robert Krueger, Lindon Eaves, and John Hibbing.

"The Genetic Heritability of Political Orientations: A New Twin Study of Political Attitudes" Annual Meeting of the International Society for Political Psychology, Dublin, Ireland (2009), with John Hibbing, Cary Funk, Kevin Smith, and Peter K Hatemi.

"The Heritability of Value Orientations" Annual meeting of the Behavior Genetics Association, Minneapolis, MN (2009), with Kevin Smith, John Hibbing, Carolyn Funk, Robert Krueger, Peter Hatemi, and Lindon Eaves.

"The Ick Factor: Disgust Sensitivity as a Predictor of Political Attitudes" Annual meeting of the Midwest Political Science Association, Chicago, IL (2009), with Kevin Smith, Douglas Oxley Matthew Hibbing, and John Hibbing.

"The Ideological Animal: The Origins and Implications of Ideology" Annual meeting of the American Political Science Association, Boston, MA (2008), with Kevin Smith, Matthew Hibbing, Douglas Oxley, and John Hibbing.

"The Physiological Differences of Liberals and Conservatives" Annual meeting of the Midwest Political Science Association, Chicago, IL (2008), with Kevin Smith, Douglas Oxley, and John Hibbing.

"Looking for Political Genes: The Influence of Serotonin on Political and Social Values" Annual meeting of the Midwest Political Science Association, Chicago, IL (2008), with Peter Hatemi, Sarah Medland, John Hibbing, and Nicholas Martin.

"Not by Twins Alone: Using the Extended Twin Family Design to Investigate the Genetic Basis of Political Beliefs" Annual meeting of the American Political Science Association, Chicago, IL (2007), with Peter Hatemi, John Hibbing, Matthew Keller, Nicholas Martin, Sarah Medland, and Lindon Eaves.

"Factorial Association: A generalization of the Fulker between-within model to the multivariate case" Annual meeting of the Behavior Genetics Association, Amsterdam, The Netherlands (2007), with Sarah Medland, Peter Hatemi, John Hibbing, William Coventry, Nicholas Martin, and Michael Neale.

"Not by Twins Alone: Using the Extended Twin Family Design to Investigate the Genetic Basis of Political Beliefs" Annual meeting of the Midwest Political Science Association, Chicago, IL (2007), with Peter Hatemi, John Hibbing, Nicholas Martin, and Lindon Eaves.

"Getting from Genes to Politics: The Connecting Role of Emotion-Reading Capability" Annual Meeting of the International Society for Political Psychology, Portland, OR, (2007.), with John Hibbing.

"The Neurological Basis of Representative Democracy." Hendricks Conference on Political Behavior, Lincoln, NE (2006), with John Hibbing.

"The Neural Basis of Representative Democracy" Annual meeting of the American Political Science Association, Philadelphia, PA (2006), with John Hibbing.

"How are Political Orientations Genetically Transmitted? A Research Agenda" Annual meeting of the Midwest Political Science Association, Chicago Illinois (2006), with John Hibbing.

"The Politics of Mate Choice" Annual meeting of the Southern Political Science Association, Atlanta, GA (2006), with John Hibbing.

"The Challenge Evolutionary Biology Poses for Rational Choice" Annual meeting of the American Political Science Association, Washington, DC (2005), with John Hibbing and Kevin Smith.

"Decision Making on Behalf of Others" Annual meeting of the American Political Science Association, Washington, DC (2005), with John Hibbing.

"The Source of Political Attitudes and Behavior: Assessing Genetic and Environmental Contributions" Annual meeting of the Midwest Political Science Association, Chicago Illinois (2005), with John Hibbing and Carolyn Funk.

"The Source of Political Attitudes and Behavior: Assessing Genetic and Environmental Contributions" Annual meeting of the American Political Science Association, Chicago Illinois (2004), with John Hibbing and Carolyn Funk.

"Accepting Authoritative Decisions: Humans as Wary Cooperators" Annual Meeting of the Midwest Political Science Association, Chicago, Illinois (2002), with John Hibbing

"Can We Trust the NES Trust Measure?" Annual Meeting of the Midwest Political Science Association, Chicago, Illinois (2001), with Stacy Ulbig.

"The Impact of Organizational Structure on the Production of Social Capital Among Group Members" Annual Meeting of the Southern Political Science Association, Atlanta, Georgia (2000), with Allison Rinden.

"Isolating the Origins of Incumbency Advantage: An Analysis of House Primaries, 1956-1998" Annual Meeting of the Southern Political Science Association, Atlanta, Georgia (2000), with Kevin Arceneaux.

"The Electorally Indistinct Senate," Norman Thomas Conference on Senate Exceptionalism, Vanderbilt University; Nashville, Tennessee; October (1999), with John R. Hibbing.

"Interest Group Participation and Social Capital" Annual Meeting of the Midwest Political Science Association, Chicago, Illinois (1999), with Allison Rinden.

"We're All in this Together: The Decline of Trust in Government, 1958-1996." The Hendricks Symposium, University of Nebraska, Lincoln. (1998)

"Constituency Population and Representation in the United States Senate," Electing the Senate; Houston, Texas; December (1989), with John R. Hibbing.

"The Disparate Electoral Security of House and Senate Incumbents," American Political Science Association Annual Meetings; Atlanta, Georgia; September (1989), with John R. Hibbing.

"Partisan and Incumbent Advantage in House Elections," Annual Meeting of the Southern Political Science Association (1987), with David W. Brady.

"Personal and Party Advantage in U.S. House Elections, 1846-1986" with David W. Brady, 1987 Social Science History Association Meetings.

"The Demise of the Upper House and the Rise of the Senate: Electoral Responsiveness in the United States Senate" with John Hibbing, 1987 Annual Meeting of the American Political Science Association.

"A Comparative Analysis of Economic Voting" with Jerome Legge, 1985 Annual Meeting of the American Political Science Association.

"An Analysis of Economic Conditions and the Individual Vote in Great Britain, 1964-1979" with Jerome Legge, 1985 Annual Meeting of the Western Political Science Association.

"Can Government Regulate Fertility? An Assessment of Pro-natalist Policy in Eastern Europe" with Jerome Legge, 1985 Annual Meeting of the Southwestern Social Science Association.

"Economic Conditions and the Individual Vote in the Federal Republic of Germany" with Jerome S. Legge, 1984 Annual Meeting of the Southern Political Science Association.

"The Conditions Required for Economic Issue Voting" with John R. Hibbing, 1984 Annual Meeting of the Midwest Political Science Association.

"Incumbency Advantage in Senate Elections," 1983 Annual Meeting of the Midwest Political Science Association.

"Television Markets and Congressional Elections: The Impact of Market/District Congruence" with James Campbell and Keith Henry, 1982 Annual Meeting of the Southern Political Science Association.

"Economic Conditions and Senate Elections" with John R. Hibbing, 1982 Annual Meeting of the Midwest Political Science Association. "Pocketbook Voting: Economic Conditions and Individual Level Voting," 1982 Annual Meeting of the American Political Science Association.

"Increased Incumbency Advantage in the House," with John R. Hibbing, 1981 Annual Meeting of the Midwest Political Science Association.

Other Conference Participation:

Roundtable Participant – Closing Round-table on Biopolitics; 2016 UC Merced Conference on Bio-Politics and Political Psychology, Merced, CA.

Roundtable Participant "Genes, Brains, and Core Political Orientations" 2008 Annual Meeting of the Southwestern Political Science Association, Las Vegas.

Roundtable Participant "Politics in the Laboratory" 2007 Annual Meeting of the Southern Political Science Association, New Orleans.

Short Course Lecturer, "What Neuroscience has to Offer Political Science" 2006 Annual Meeting of the American Political Science Association.

Panel chair and discussant, "Neuro-scientific Advances in the Study of Political Science" 2006 Annual Meeting of the American Political Science Association.

Presentation, "The Twin Study Approach to Assessing Genetic Influences on Political Behavior" Rice Conference on New Methods for Understanding Political Behavior, 2005.

Panel discussant, "The Political Consequences of Redistricting," 2002 Annual Meeting of the American Political Science Association.

Panel discussant, "Race and Redistricting," 1999 Annual Meeting of the Midwest Political Science Association.

Invited participant, "Roundtable on Public Dissatisfaction with American Political Institutions", 1998 Annual Meeting of the Southwestern Social Science Association.

Presentation, "Redistricting in the '90s," Texas Economic and Demographic Association, 1997.

Panel chair, "Congressional Elections," 1992 Annual Meeting of the Southern Political Science Association.

Panel discussant, "Incumbency and Congressional Elections," 1992 Annual Meeting of the American Political Science Association.

Panel chair, "Issues in Legislative Elections," 1991 Annual Meeting of the Midwest Political Science Association.

Panel chair, "Economic Attitudes and Public Policy in Europe," 1990 Annual Meeting of the Southern Political Science Association

Panel discussant, "Retrospective Voting in U.S. Elections," 1990 Annual Meeting of the Midwest Political Science Association.

Co-convener, with Bruce Oppenheimer, of Electing the Senate, a national conference on the NES 1988 Senate Election Study. Funded by the Rice Institute for Policy Analysis, the University of Houston Center for Public Policy, and the National Science Foundation, Houston, Texas, December, 1989.

Invited participant, Understanding Congress: A Bicentennial Research Conference, Washington, D.C., February, 1989.

Invited participant--Hendricks Symposium on the United States Senate, University of Nebraska, Lincoln, Nebraska, October, 1988

Invited participant--Conference on the History of Congress, Stanford University, Stanford, California, June, 1988.

Invited participant, "Roundtable on Partisan Realignment in the 1980's", 1987 Annual Meeting of the Southern Political Science Association.

Professional Activities:

Other Universities:

Invited Speaker, Annual Lecture, Psi Kappa -the Psychology Club at Houston Community College, 2018.

Invited Speaker, Annual Allman Family Lecture, Dedman College Interdisciplinary Institute, Southern Methodist University, 2016.

Invited Speaker, Annual Lecture, Psi Sigma Alpha – Political Science Dept., Oklahoma State University, 2015.

Invited Lecturer, Department of Political Science, Vanderbilt University, 2014.

Invited Speaker, Annual Lecture, Psi Kappa -the Psychology Club at Houston Community College, 2014.

Invited Speaker, Graduate Student Colloquium, Department of Political Science, University of New Mexico, 2013.

Invited Keynote Speaker, Political Science Alumni Evening, University of Houston, 2013.

Invited Lecturer, Biology and Politics Masters Seminar (John Geer and David Bader), Department of Political Science and Biology Department, Vanderbilt University, 2010.

Invited Lecturer, Biology and Politics Senior Seminar (John Geer and David Bader), Department of Political Science and Biology Department, Vanderbilt University, 2008.

Visiting Fellow, the Hoover Institution, Stanford University, 2007.

Invited Speaker, Joint Political Psychology Graduate Seminar, University of Minnesota, 2007.

Invited Speaker, Department of Political Science, Vanderbilt University, 2006.

Member:

Editorial Board, Journal of Politics, 2007-2008.

Planning Committee for the National Election Studies' Senate Election Study, 1990-92.

Nominations Committee, Social Science History Association, 1988

Reviewer for:

American Journal of Political Science
American Political Science Review
American Politics Research
American Politics Quarterly
American Psychologist
American Sociological Review
Canadian Journal of Political Science
Comparative Politics
Electoral Studies
Evolution and Human Behavior
International Studies Quarterly

Journal of Politics
Journal of Urban Affairs
Legislative Studies Quarterly
National Science Foundation
PLoS ONE
Policy Studies Review
Political Behavior
Political Communication
Political Psychology
Political Research Quarterly
Public Opinion Quarterly
Science
Security Studies
Social Forces
Social Science Quarterly
Western Political Quarterly

University Service:

Member, University Senate, 2021-2023.

Member, University Parking Committee, 2016-2022.

Member, University Benefits Committee, 2013-2016.

Internship Director for the Department of Political Science, 2004-2018.

Member, University Council, 2012-2013.

Invited Speaker, Rice Classroom Connect, 2016.

Invited Speaker, Glasscock School, 2016.

Invited Speaker, Rice Alumni Association, Austin, 2016.

Invited Speaker, Rice Alumni Association, New York City, 2016.

Invited Speaker, Rice TEDxRiceU , 2013.

Invited Speaker, Rice Alumni Association, Atlanta, 2011.

Lecturer, Advanced Topics in AP Psychology, Rice University AP Summer Institute, 2009.

Scientia Lecture Series: "Politics in Our Genes: The Biology of Ideology" 2008

Invited Speaker, Rice Alumni Association, Seattle, San Francisco and Los Angeles, 2008.

Invited Speaker, Rice Alumni Association, Austin, Chicago and Washington, DC, 2006.

Invited Speaker, Rice Alumni Association, Dallas and New York, 2005.

Director: Rice University Behavioral Research Lab and Social Science Computing Lab, 2005-2006.

University Official Representative to the Inter-university Consortium for Political and Social Research, 1989-2012.

Director: Rice University Social Science Computing Lab, 1989-2004.

Member, Rice University Information Technology Access and Security Committee, 2001-2002

Rice University Committee on Computers, Member, 1988-1992, 1995-1996; Chair, 1996-1998, Co-chair, 1999.

Acting Chairman, Rice Institute for Policy Analysis, 1991-1992.

Divisional Member of the John W. Gardner Dissertation Award Selection Committee, 1998

Social Science Representative to the Educational Sub-committee of the Computer Planning Committee, 1989-1990.

Director of Graduate Admissions, Department of Political Science, Rice University, 1986-1988.

Co-director, Mellon Workshop: Southern Politics, May, 1988.

Guest Lecturer, Mellon Workshop: The U.S. Congress in Historical Perspective, May, 1987 and 1988.

Faculty Associate, Hanszen College, Rice University, 1987-1990.

Director, Political Data Analysis Center, University of Georgia, 1982-1985.

External Consulting:

Expert Witness, Johnson v. Wisconsin Elections Commission, 2022.

Expert Witness, Grant v. Raffensperger, challenge Georgia congressional map, 2022

Expert Witness, Brooks et al. v. Abbot, challenge to State Senate District 10, 2022.

Consultant, Lancaster ISD – redrawing of all school board member election districts including demographic analysis and redrawing of election districts, 2021.

Consultant, City of Baytown – redrawing of all city council member election districts including demographic analysis and redrawing of election districts, 2021.

Consultant, Goose Creek ISD – redrawing of all board member election districts including demographic analysis and redrawing of election districts, 2021.

Expert Witness, Christian Ministerial Alliance et al v. Arkansas, racially polarized voting analysis, 2020.

Expert Witness, Bruni et al. v. State of Texas, straight ticket voting analysis, 2020.

Consulting Expert, Sarasota County, VRA challenge to district map, 2020.

Expert Witness, Kumar v. Frisco ISD, TX, racially polarized voting analysis, 2019.

Expert Witness, Vaughan v. Lewisville ISD, TX, racially polarized voting analysis, 2019.

Expert Witness, Johnson v. Ardoin, (Louisiana), racially polarized voting analysis, 2019.

Expert Witness, Flores et al. v. Town of Islip, NY, racially polarized voting analysis, 2018.

Expert Witness, Tyson v. Richardson ISD, racially polarized voting analysis, 2018.

Expert Witness, Dwight v. State of Georgia, racially polarized voting analysis, 2018.

Expert Witness, NAACP v. East Ramapo Central School District, racially polarized voting analysis, 2018.

Expert Witness, Georgia NAACP v. State of Georgia, racially polarized voting analysis, 2018.

Expert Witness, United States v. City of Eastpoint, racially polarized voting analysis, 2017.

Expert Witness, Georgia NAACP v. Gwinnett County, racially polarized voting analysis, 2017.

Expert Witness for the State of Texas, Lopez, et al v. Abbott, a challenge to the current system of statewide at-large elections for the Texas Supreme Court and the Texas Court of Criminal Appeals, including election analysis, and racially polarized voting analysis, 2017.

Expert witness for the State of Texas, Perez, et al v State of Texas (and consolidated cases), challenge to adopted Texas election districts for the US Congress and the Texas House of Representatives, 2011-2017.