Rodden Decl. Ex. A

Jonathan Rodden

Stanford University
Department of Political Science
Encina Hall Central
616 Serra Street
Stanford, CA 94305

Phone: (650) 723-5219
Email: jrodden@stanford.edu
Homepage: http://www.jonathanrodden.com

Personal

Born on August 18. 1971, St. Louis, MO.

United States Citizen.

Education

Ph.D. Political Science, Yale University, 2000.

Fulbright Scholar, University of Leipzig, Germany, 1993–1994.

B.A., Political Science, University of Michigan, 1993.

Academic Positions

Professor, Department of Political Science, Stanford University, 2012–present.

Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

Associate Professor, Department of Political Science, Stanford University, 2007–2012.

Fellow, Center for Advanced Study in the Behavioral Sciences, Palo Alto, CA, 2006–2007.

Ford Career Development Associate Professor of Political Science, MIT, 2003–2006.

Visiting Scholar, Center for Basic Research in the Social Sciences, Harvard University, 2004.

Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

Publications

Books

Why Cities Lose: The Deep Roots of the Urban-Rural Divide. Basic Books, 2019.

Decentralized Governance and Accountability: Academic Research and the Future of Donor Programming. Co-edited with Erik Wibbels, Cambridge University Press, 2019.

Hamilton's Paradox: The Promise and Peril of Fiscal Federalism, Cambridge University Press, 2006. Winner, Gregory Luebbert Award for Best Book in Comparative Politics, 2007; Martha Derthick Award for lasting contribution to the study of federalism, 2021.

Fiscal Decentralization and the Challenge of Hard Budget Constraints, MIT Press, 2003. Co-edited with Gunnar Eskeland and Jennie Litvack.

Peer Reviewed Journal Articles

Who Registers? Village Networks, Household Dynamics, and Voter Registration in Rural Uganda, 2021, *Comparative Political Studies* forthcoming (with Romain Ferrali, Guy Grossman, and Melina Platas).

Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering, 2021, *Political Analysis* forthcoming (with Daryl DeFord Nick Eubank).

Who is my Neighbor? The Spatial Efficiency of Partisanship, 2020, *Statistics and Public Policy* 7(1):87-100 (with Nick Eubank).

Handgun Ownership and Suicide in California, 2020, *New England Journal of Medicine* 382:2220-2229 (with David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller).

Viral Voting: Social Networks and Political Participation, 2020, *Quarterly Journal of Political Science* (with Nick Eubank, Guy Grossman, and Melina Platas).

It Takes a Village: Peer Effects and Externalities in Technology Adoption, 2020, *American Journal of Political Science* (with Romain Ferrali, Guy Grossman, and Melina Platas). Winner, 2020 Best Conference Paper Award, American Political Science Association Network Section.

Assembly of the LongSHOT Cohort: Public Record Linkage on a Grand Scale, 2019, *Injury Prevention* (with Yifan Zhang, Erin Holsinger, Lea Prince, Sonja Swanson, Matthew Miller, Garen Wintemute, and David Studdert).

Crowdsourcing Accountability: ICT for Service Delivery, 2018, *World Development* 112: 74-87 (with Guy Grossman and Melina Platas).

Geography, Uncertainty, and Polarization, 2018, *Political Science Research and Methods* doi:10.1017/psrm.2018.12 (with Nolan McCarty, Boris Shor, Chris Tausanovitch, and Chris Warshaw).

Handgun Acquisitions in California after Two Mass Shootings, 2017, *Annals of Internal Medicine* 166(10):698-706. (with David Studdert, Yifan Zhang, Rob Hyndman, and Garen Wintemute).

Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders, 2015, *Election Law Journal* 14,4:1-15 (with Jowei Chen).

The Achilles Heel of Plurality Systems: Geography and Representation in Multi-Party Democracies, 2015, *American Journal of Political Science* 59,4: 789-805 (with Ernesto Calvo). Winner, Michael Wallerstein Award for best paper in political economy, American Political Science Association.

Why has U.S. Policy Uncertainty Risen Since 1960?, 2014, *American Economic Review: Papers and Proceedings* May 2014 (with Nicholas Bloom, Brandice Canes-Wrone, Scott Baker, and Steven Davis).

Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, 2013, *Quarterly Journal of Political Science* 8: 239-269 (with Jowei Chen).

How Should We Measure District-Level Public Opinion on Individual Issues?, 2012, *Journal of Politics* 74, 1: 203-219 (with Chris Warshaw).

Representation and Redistribution in Federations, 2011, *Proceedings of the National Academy of Sciences* 108, 21:8601-8604 (with Tiberiu Dragu).

Dual Accountability and the Nationalization of Party Competition: Evidence from Four Federatons, 2011, *Party Politics* 17, 5: 629-653 (with Erik Wibbels).

The Geographic Distribution of Political Preferences, 2010, *Annual Review of Political Science* 13: 297–340.

Fiscal Decentralization and the Business Cycle: An Empirical Study of Seven Federations, 2009, *Economics and Politics* 22,1: 37–67 (with Erik Wibbels).

Getting into the Game: Legislative Bargaining, Distributive Politics, and EU Enlargement, 2009, *Public Finance and Management* 9, 4 (with Deniz Aksoy).

The Strength of Issues: Using Multiple Measures to Gauge Preference Stability, Ideological Constraint, and Issue Voting, 2008. *American Political Science Review* 102, 2: 215–232 (with Stephen Ansolabehere and James Snyder).

Does Religion Distract the Poor? Income and Issue Voting Around the World, 2008, *Comparative Political Studies* 41, 4: 437–476 (with Ana Lorena De La O).

Purple America, 2006, *Journal of Economic Perspectives* 20,2 (Spring): 97–118 (with Stephen Ansolabehere and James Snyder).

Economic Geography and Economic Voting: Evidence from the U.S. States, 2006, *British Journal of Political Science* 36, 3: 527–47 (with Michael Ebeid).

Distributive Politics in a Federation: Electoral Strategies, Legislative Bargaining, and Government Coalitions, 2004, *Dados* 47, 3 (with Marta Arretche, in Portuguese).

Comparative Federalism and Decentralization: On Meaning and Measurement, 2004, *Comparative Politics* 36, 4: 481-500. (Portuguese version, 2005, in *Revista de Sociologia e Politica* 25).

Reviving Leviathan: Fiscal Federalism and the Growth of Government, 2003, *International Organization* 57 (Fall), 695–729.

Beyond the Fiction of Federalism: Macroeconomic Management in Multi-tiered Systems, 2003, *World Politics* 54, 4 (July): 494–531 (with Erik Wibbels).

The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World, 2002, *American Journal of Political Science* 46(3): 670–687.

Strength in Numbers: Representation and Redistribution in the European Union, 2002, *European Union Politics* 3, 2: 151–175.

Does Federalism Preserve Markets? *Virginia Law Review* 83, 7 (with Susan Rose-Ackerman). Spanish version, 1999, in *Quorum* 68.

Working Papers

Elections, Political Polarization, and Economic Uncertainty, NBER Working Paper 27961 (with Scott Baker, Aniket Baksy, Nicholas Bloom, and Steven Davis).

Federalism and Inter-regional Redistribution, Working Paper 2009/3, Institut d'Economia de Barcelona.

Representation and Regional Redistribution in Federations, Working Paper 2010/16, Institut d'Economia de Barcelona (with Tiberiu Dragu).

Chapters in Books

Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), in *Political Geometry*, edited by Moon Duchin and Olivia Walch, forthcoming 2021, Springer.

Keeping Your Enemies Close: Electoral Rules and Partisan Polarization, in *The New Politics of Insecurity*, edited by Frances Rosenbluth and Margaret Weir, forthcoming 2021, Cambridge University Press.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

The Political Economy of Federalism, 2006, in Barry Weingast and Donald Wittman, eds., *Oxford Handbook of Political Economy*, Oxford University Press.

Fiscal Discipline in Federations: Germany and the EMU, 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Online Interactive Visualization

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

Other Publications

Supporting Advanced Manufacturing in Alabama, Report to the Alabama Innovation Commission, Hoover Institution, 2021.

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

On the Migration of Fiscal Sovereignty, 2004, *PS: Political Science and Politics* July, 2004: 427–431.

Decentralization and the Challenge of Hard Budget Constraints, *PREM Note* 41, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies 32,7: 897-900.*

Fellowships, Honors, and Grants

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy

Introduction to Comparative Politics

Introduction to Political Science

Political Science Scope and Methods

Institutional Economics

Spatial Approaches to Social Science

Graduate

Political Economy

Political Economy of Institutions

Federalism and Fiscal Decentralization

Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Curcuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006–2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008–2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998–2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: September 23, 2021

Rodden Decl. Ex. B

IN THE SUPREME COURT OF OHIO

Bria Bennett, *et al.*, **Relators,** **v.** **Ohio Redistricting Commission, *et al.*,** **Respondents.**	**Case No. _____** Original Action Filed Pursuant to Ohio Constitution, Article XI, Section 9(A) *[Apportionment Case Pursuant to S. Ct. Prac. R. 14.03]*

AFFIDAVIT OF DR. JONATHAN RODDEN

I, Jonathan Rodden, having been duly sworn and cautioned according to law, hereby state that I am over the age of eighteen years and am competent to testify to the facts set forth below based on my personal knowledge and having personally examined all records referenced in this affidavit, and further state as follows:

1. I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. I am engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including ballots and election results at the level of polling places, individual records of registered voters, census data, and survey responses. I am also a senior fellow at the Stanford Institute for Economic Policy Research and the Hoover Institution. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Exhibit G.

2. In my current academic work, I conduct research on the relationship between the patterns of political representation, geographic location of demographic and partisan groups, and the drawing of electoral districts. I have published papers using statistical methods to assess political geography, balloting, and representation in a variety of academic journals including *Statistics and Public Policy, Proceedings of the National Academy of Science*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the *Virginia Law Review*, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics.* One of these papers was selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the best paper on political economy published in the last year, and another received an award from the American Political Science Association section on social networks. In 2021, I received a John Simon Guggenheim Memorial Foundation Fellowship, and received the Martha Derthick Award of the American Political Science

Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations."

3. I have recently written a series of papers, along with my co-authors, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science*, *Election Law Journal*, and *Political Analysis*, and it has been featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I have recently completed a book, published by *Basic Books* in June of 2019, on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts. The book was reviewed in *The New York Times*, *The New York Review of Books*, *Wall Street Journal*, *The Economist*, and *The Atlantic*, among others.

4. I have expertise in the use of large data sets and geographic information systems (GIS), and conduct research and teaching in the area of applied statistics related to elections. My PhD students frequently take academic and private sector jobs as statisticians and data scientists. I frequently work with geo-coded voter files and other large administrative data sets, including in recent papers published in the *Annals of Internal Medicine* and *The New England Journal of Medicine.* I have developed a national data set of geo-coded precinct-level election results that has been used extensively in policy-oriented research related to redistricting and representation.

5. I have been accepted and testified as an expert witness in six election law and redistricting cases: *Romo v. Detzner,* No. 2012-CA-000412 (Fla. Cir. Ct. 2012); *Mo. State Conference of the NAACP* v. *Ferguson-Florissant Sch. Dist.,* No. 4:2014-CV-02077 (E.D. Mo. 2014); *Lee v. Va. State Bd. of Elections,* No. 3:15-CV-00357 (E.D. Va. 2015); *Democratic Nat'l Committee et al. v. Hobbs et al.*, No. 16-1065-PHX-DLR (D. Ariz. 2016); *Bethune-Hill v. Virginia State Board of Elections*, No. 3:14-cv-00852-REP-AWA-BMK (E.D. Va. 2014); and *Jacobson et al. v. Lee*, No. 4:18-cv-00262 (N.D. Fla. 2018). I also worked with a coalition of academics to file Amicus Briefs in the Supreme Court in *Gill v. Whitford*, No. 16-1161, and *Rucho v. Common Cause*, No. 18-422. Much of the testimony in these cases had to do with geography, electoral districts, voting, ballots, and election administration. I am currently working as a consultant for the Maryland Redistricting Commission. I am being compensated at the rate of $550/hour for my work in this case. My compensation is not dependent upon my conclusions in any way.

I. INTRODUCTION AND SUMMARY

6. For the purpose of this affidavit, I have been asked to examine whether the redistricting plan for the Ohio State House of Representatives and Ohio Senate, adopted by the Ohio Redistricting Commission on September 16, 2021, and attached as Exhibit A ("2021 Commission Plan"), complies with the standard set forth in Article XI, Section 6(B), namely, that "[t]he statewide proportion of districts whose voters, based on statewide state and federal partisan general election results during the last ten years, favor each political party shall correspond closely to the statewide preferences of the voters of Ohio."

7. I demonstrate that this "partisan proportionality" standard was clearly not met by the maps adopted by the Ohio Redistricting Commission.

8. Furthermore, I have been asked to examine whether the partisan composition of the Commission's maps may have been a result of the Commission's need to satisfy other requirements of the Ohio Constitution: specifically, the requirements to avoid county and municipal splits, laid out in Article XI, Sections 3 and 4, and to attempt to draw compact districts, as set forth in Article XI, Section 6(C).

9. I examine several additional maps that were available to the Commission, and to the public, prior to September 15. I demonstrate that these maps were able to abide by the "partisan proportionality" clause while also abiding by the strict rules of the Ohio Constitution regarding county and municipality splits, and while creating districts with similar or better compactness scores than those drawn by the Commission.

II. DATA SOURCES

10. I have collected statewide election data for 2012 to 2020 from the Ohio Secretary of State. I also accessed precinct-level election results from the Ohio Secretary of State for statewide elections from 2016 to 2020 that were matched to 2020 Ohio vote tabulation districts by a team at Harvard University called the Algorithm-Assisted Redistricting Methodology Project.[1] Additionally, I accessed the proposed and adopted Ohio redistricting plans uploaded to the web page of the Ohio Redistricting Commission, true copies of which are attached as Exhibits A, C, D, and E.[2]

III. MEASURING PARTISAN PROPORTIONALITY

11. The Ohio Constitution instructs the commissioners to use "statewide state and federal partisan general election results during the last ten years" to ascertain the "statewide preferences of the voters of Ohio," and attempt to draw a map in which the "statewide proportion of districts whose voters favor each party shall correspond closely" to those "statewide preferences."

12. As further discussed below, the only reasonable way to implement this notion of "statewide preferences," as ascertained from past elections to anticipated future seat shares, is via the proportion of votes received by the candidates for the two parties. That is to say, if a party won 50 percent of the average statewide vote in the relevant elections, a proposed map should favor that party—aggregating the results of those same elections—in somewhere very close to 50 percent of the seats.

13. The first task, then, is to establish this target from the last decade of statewide partisan election results. Figure 1 provides a visualization of Ohio statewide general election results from 2012 to 2020. Ohio is a hotly contested state with a tradition of split-ticket voting and significant swings from one year to another. The Democratic candidate won the presidential

[1] https://alarm-redist.github.io/posts/2021-08-10-census-2020/
[2] https://redistricting.ohio.gov/maps

contest in 2012, but the Republican candidate won in 2016 and 2020. Ohio's U.S. Senate delegation is typically split between the parties, and other statewide elections are often very competitive, although 2014 was an exception, as was the 2016 U.S. Senate race.

14. Figure 1 reveals that while Ohio statewide elections have been mostly quite close over the last decade, Republican candidates have held a narrow advantage. To quantify this, Table 1 provides the raw data. Including all of the statewide general elections from 2012 to 2020, the Democratic vote share of the two-party vote (ignoring small parties and write-in candidates) was around 45.9 percent.

Figure 1: Statewide General Election Outcomes, Ohio, 2012-2020

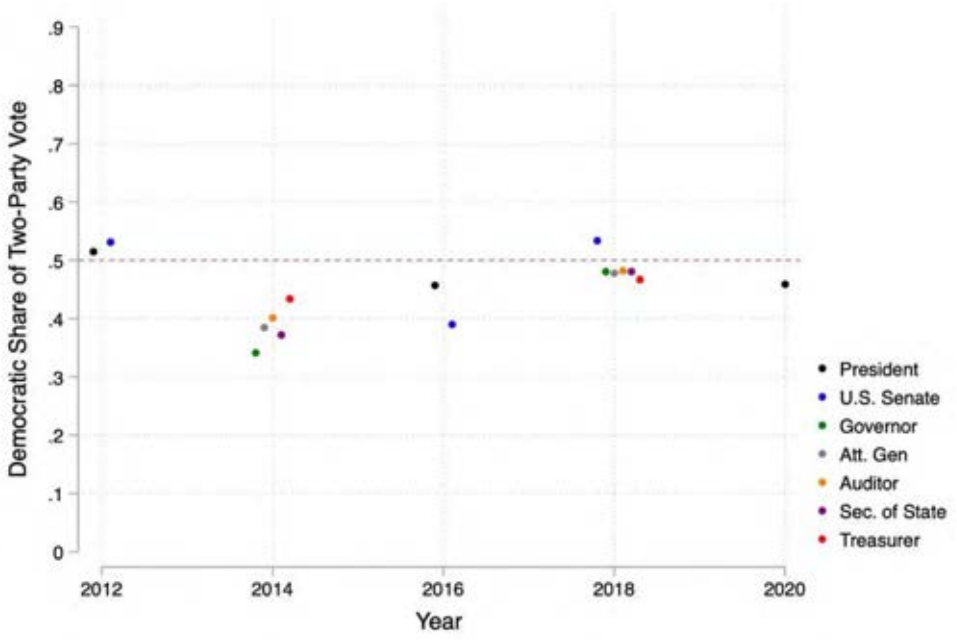


Table 1: Statewide General Election Outcomes, Ohio, 2012-2020

	Democratic Votes	Republican Votes	Other	Two-party Democratic Vote Share
2012 President	2,827,709	2,661,439	91,791	51.5%
2012 U.S. Senate	2,762,766	2,435,744	250,618	53.1%
2014 Governor	1,009,359	1,944,848	101,706	34.2%
2014 Att. Gen.	1,178,426	1,882,048		38.5%
2014 Auditor	1,149,305	1,711,927	143,363	40.2%
2014 Sec. of State	1,074,475	1,811,020	141,292	37.2%
2014 Treasurer	1,323,325	1,724,060		43.4%
2016 President	2,394,164	2,841,005	261,318	45.7%
2016 Senate	1,996,908	3,118,567	258,689	39.0%
2018 Senate	2,358,508	2,057,559	1,017	53.4%
2018 Governor	2,070,046	2,235,825	129,949	48.1%
2018 Att. Gen.	2,086,715	2,276,414		47.8%
2018 Auditor	2,008,295	2,156,663	175,962	48.2%
2018 Sec. of State	2,052,098	2,214,273	103,585	48.1%
2018 Treasurer	2,024,194	2,308,425		46.7%
2020 President	2,679,165	3,154,834	88,203	45.9%
Sum, all elections	**30,995,458**	**36,534,651**	**1,747,493**	**45.9%**
Sum, 2016-2020	**19,670,093**	**22,363,565**	**1,018,723**	**46.8%**

15. Determining the proportion of districts that favor each party, as set forth in Article XI, Section 6, requires an aggregation of the precinct-level results of these past elections to the boundaries of its proposed districts. However, precinct-level election results linked with geo-spatial boundaries were not available for the 2012 and 2014 elections, as the Commission itself acknowledged in its Article XI, Section 8(C)(2) Statement, attached as Exhibit F. Thus, Table 1 also sets forth that the two-party Democratic vote share in 2016, 2018, and 2020 general elections was around 47 percent.

16. Accordingly, using the full statewide election results from 2012 to 2020, the Ohio Constitution requires the Commission to attempt to draw state legislative maps in which 45.9 percent of seats favor Democrats and 54.1 percent of seats favor Republican. Since there are 99 seats in the Ohio House of Representatives, a statewide vote share of 45.9 percent would be associated with 45.44 Democratic seats, which rounds down to 45 seats. Similarly, a 45.9 percent vote share would be associated with about 15.15 Democratic seats in the 33-member Ohio Senate, which rounds down to 15 seats.

17. I have aggregated the precinct-level results of each election from 2016 to 2020 included in Table 1 to the level of the districts in the 2021 Commission Plan. For each district, I calculate the average Democratic share of the votes received by the candidates of the two major parties across each of these elections. I then ascertain the number of districts in which this quantity is greater than 50 percent. Using this technique, I ascertain that the 2021 Commission Plan produced 37 majority-Democratic House seats and 62 majority-Republican House seats, as shown in Table 2 below. In the Senate, the 2021 Commission Plan produced 10 majority-Democratic Senate seats and 23 majority-Republican seats. This is a gap of 8 House seats and 5 Senate seats between the Democratic-leaning seats produced by the 2021 Commission Plan and the seat share that would be proportionate to the statewide Democratic vote share.

18. Notably, the partisanship of the Commission's maps is not very different from that of the current maps, adopted in 2011 and attached as Exhibit B. The current breakdown of the General Assembly under the 2011 maps is as follows: 35 Democrats and 64 Republicans in the House; 8 Democrats and 25 Republicans in the Senate.

19. In addition to this examination of seats above and below the 50 percent cut-point, it is also useful to examine how many of the Democratic- and Republican-leaning seats are razor-thin majorities, and how many are more comfortable majorities. I count the number of seats where the average Democratic share of the vote for the two major parties was less than 48 percent—let us call these expected Republican seats. And I count the number of seats where the average Democratic share of the vote for the two major parties was greater than 52 percent—let us call these expected Democratic seats. Finally, I count the number of seats that we might call "tossups," where the average Democratic vote share was between 48 percent and 52 percent.

20. As set forth in Table 2 below, in the 2021 Commission Plan, all of the majority-Republican House seats are greater than 52 percent Republican. Of the 37 majority-Democratic seats, only 32 are greater than 52 percent Democratic. All five of the "toss-up" seats are slim Democratic majorities. In the Commission's Senate plan, there are 21 expected Republican seats, 9 expected Democratic seats, and three "toss-ups."

21. In its Article XI, Section 8(C)(2) Statement, the Commission explained its ostensible attempt to comply with the "partisan proportionality" requirement in the Ohio Constitution. In this statement, the Ohio Redistricting Commission offers an unsound implementation of the constitutional requirement, suggesting that "statewide preferences" can be measured as the share of all elections in which each party received more votes than the other party. This is a flawed way of characterizing voter preferences in general, but especially when the purpose is to evaluate seat shares. With this interpretation, a party that always wins 50.01 percent of the vote in general elections would be viewed as having 100 percent of the "statewide preference," entitling it to draw a map that gave itself all of the seats, a patently absurd outcome.

22. Consider, for example, a situation in which the United States adopted Ohio's constitutional amendment for U.S. House of Representatives districts. The only nationwide elections are presidential elections, for which Democratic candidates have won a majority of popular votes in each election since 2004, although many of these elections were extremely close. By the

Commission's logic, voters preferred Democratic candidates 100 percent of the time, and would therefore be entitled to 100 percent of the seats in Congress. This is simply not a tenable notion of voter preferences. In the vast academic literature on votes and seats, I have never encountered the notion that the seat share should correspond to the share of past elections in which a party received a plurality. Rather, the Ohio Constitution is clearly invoking the notion of voter preferences used by academics, pundits, and everyone else: the vote share.

IV. COMPARING THE COMMISSION'S MAPS TO ALTERNATIVE MAPS PRESENTED TO THE COMMISSION

23. It is clearly the case that the 2021 Commission Plan deviates significantly from any reasonable interpretation of the Ohio Constitution's partisan fairness requirement. But one might imagine that the partisan composition of the Commission's maps was a function of constraints imposed by other constitutional requirements related to so-called "traditional redistricting principles" that the Commission understood to be more important.

24. In fact, the next line after the "partisan proportionality" clause dictates that the Commission "shall attempt" to draw compact districts. One might wonder whether the Commission found it difficult to achieve partisan proportionality because of a tension between that goal and the additional goal of drawing compact districts. Moreover, the Constitution requires that the Commission use entire counties, municipal corporations, and townships as the building blocks of districts to the extent possible. Counties with population greater than that which is sufficient for a single district must spill into only a single additional district. The Commission must also endeavor not to split counties more than once, and not to split more than one municipality per district. One might imagine that efforts to abide by these requirements made it difficult for the Commission to achieve partisan proportionality.

25. A simple and effective way to examine such assumptions is to examine other maps that had been made available to the Commission before it finalized its own maps. Did those maps come closer to achieving partisan proportionality while abiding by the same rules and achieving similar benchmarks with respect to the traditional redistricting principles emphasized in the Constitution? If so, one cannot accept the claim that the Commission was forced by restrictive rules into drawing maps with a large advantage for one party.

26. I have therefore aggregated precinct-level election results to the level of proposed districts for a map introduced by Senator Sykes on September 2, attached as Exhibit C. An additional map was proposed by a group called the "Ohio Citizens Redistricting Commission" and is attached as Exhibit E. Based on my review, these maps are fully compliant with the line-drawing rules explained above, as set forth in Article XI, Sections 3 and 4 of the Ohio Constitution.

27. For each of these maps, as well as the 2021 Commission Plan and maps the Commission initially proposed, attached as Exhibit D, I have also produced compactness scores for the districts to assess the maps' compliance with Article XI, Section 6(C). I have included Reock, Polsby-Popper, and Convex Hull compactness measures, each of which takes a somewhat different approach to the notion of district compactness.

28. Although the Ohio Constitution does not specify the optimal number of county splits, I have also calculated the number of county splits generated by each plan. I define a county split in the same way as the Ohio Constitution. For example, Franklin County is not considered to be split in a House of Representatives plan if 11 districts are formed that fit completely within the county, and no fragment of any district spills over the county boundary. Moreover, a county that is kept intact but joined together with other "split" counties is not considered a split county. A county is only considered to be split if some part—but not all—of its territory is joined with territory from another county in the formation of a district.

29. In Table 2 below, I provide compactness scores and information on county splits for each of the Ohio House of Representatives plans I analyzed. Next, using the same technique described above, I include the number of majority-Democratic districts, majority-Republican districts, expected Democratic districts, expected Republican districts, and "toss-up" districts that would be produced by each plan.

30. First, in terms of compactness, the 2021 Commission Plan was similar to the plans submitted by Senator Sykes and the Citizens' Commission. If anything, the plan produced by the Citizens' Commission was on average more compact, according to both the Polsby-Popper and Convex Hull scores, and Senator Sykes's plan was slightly more compact according to its Polsby-Popper score.

31. The Commission's House map splits 33 counties. The Citizens' Commission splits a greater number of counties (43) than does the Ohio Redistricting Commission, while Senator Sykes's House map splits fewer counties (only 30).

32. Next, let us examine the partisan outcomes associated with these alternative plans. The relevant information is contained in Table 2. The plan submitted by Senator Sykes came very close to achieving partisan proportionality. It produced 44 majority-Democratic seats and 55 majority-Republican seats—a difference from proportionality of only one seat. The plan produced by the Citizens' Commission produced 43 Democratic seats and 56 Republican seats—a difference from proportionality of only 2 seats. Again, the distance from proportionality in the Ohio Redistricting Commission's final House map was 8 seats.

33. In short, Senator Sykes's plan for the Ohio House of Representatives does just as well—in fact a little better—than the Commission's House map at abiding by the traditional redistricting criteria emphasized in the Ohio Constitution, and it also comes much closer to achieving the required partisan proportionality. This indicates that the failure of the 2021 Commission Plan to achieve partisan proportionality and its overall favorability to Republicans was an intentional choice, rather than a natural outgrowth of other constraints.

Table 2: Summary Information, Ohio House of Representative Plans Submitted to Ohio Redistricting Commission

	Commission 9/16	Commission 9/9	Sykes 9/2	Citizens 9/10
Average compactness scores				
(Higher scores = more compact)				
Reock	0.40	0.40	0.40	0.40
Polsby-Popper	0.30	0.30	0.31	0.34
Area/Convex Hull	0.74	0.73	0.74	0.76
Number of split counties	33	33	30	43
# of seats with average two-party *Democratic* vote share >.5	37	32	44	43
Expressed as percentage of seats	37.4%	32.3%	44.4%	43.4%
# of seats with average two-party *Republican* vote share >.5	62	67	55	56
Expressed as percentage of seats	62.6%	67.7%	55.6%	56.6%
Distance from proportional seat allocation (seats)	8	13	1	2
Expressed as percentage of seats	8.1%	13.1%	1.0%	2.0%
# of seats with average two-party Democratic vote share >.52	32	31	41	42
Expressed as a percentage of seats	32.3%	31.3%	41.4%	42.4%
# of seats with average two-party Democratic vote share <.48	62	63	54	54
Expressed as percentage of seats	62.6%	63.6%	54.5%	54.5%
# of seats with average two-party Democratic vote share between .48 and .52	5	5	4	3
Expressed as percentage of seats	5.1%	5.1%	4.0%	3.0%

Table 3: Summary Information, Ohio Senate Plans Submitted to Ohio Redistricting Commission

	Commission 9/16	Commission 9/9	Sykes 9/2	Citizens 9/10
Average compactness scores				
(Higher scores = more compact)				
Reock	0.39	0.39	0.39	0.43
Polsby-Popper	0.31	0.31	0.31	0.37
Area/Convex Hull	0.73	0.72	0.73	0.78
Number of split counties	13	13	16	18
# of seats with average two-party Democratic vote share >.5	10	9	14	14
Expressed as percentage of seats	30.3%	27.3%	42.4%	42.4%
# of seats with average two-party *Republican* vote share >.5	23	24	19	19
Expressed as percentage of seats	69.7%	72.7%	57.6%	57.6%
Distance from proportional seat allocation (seats)	5	6	1	1
Expressed as percentage of seats	15.2%	18.2%	3.0%	3.0%
# of seats with average two-party Democratic vote share >.52	9	8	13	12
Expressed as a percentage of seats	9.1%	8.1%	13.1%	12.1%
# of seats with average two-party Democratic vote share <.48	21	21	18	18
Expressed as percentage of seats	63.6%	63.6%	54.5%	54.5%
# of seats with average two-party Democratic vote share between .48 and .52	3	4	2	3
Expressed as percentage of seats	3.0%	4.0%	2.0%	3.0%

34. Next, let us undertake a similar comparison of the Ohio Redistricting Commission's Senate map with those submitted by Senator Sykes and the Citizens' Commission. The key information is contained in Table 3.

35. Once again, the plan presented by Senator Sykes demonstrated a similar level of average compactness as the Commission's map on each of the three metrics I considered. And again, the plans produced by the Citizens' Commission were more compact. Relative to the Commission's Senate map, the Sykes map split three additional counties, and the Citizens' map split five additional counties.

36. The Commission's Senate map produces only 10 majority-Democratic seats and 23 majority-Republican Seats. In contrast, both the Sykes plan and the Citizens' Commission plan produced 14 Democratic seats and 19 Republican seats. Recall that the target set forth by the Constitution was 15 Democratic seats, meaning that both plans came within a single seat of the target. Again, as with the House of Representatives, these alternative maps demonstrate that for the Senate as well, it is possible to abide both by the Ohio Constitution's traditional redistricting requirements as well as its partisan proportionality requirement. The fact that the Commission's map strongly favors the Republican Party is the result of discretionary choices made by the Commission and reflects that the Commission did not attempt to achieve partisan proportionality.

V. CONCLUSION

37. The 2021 Commission Plan does not comply with the partisan proportionality requirement set forth in Article XI, Section 6(B).

38. The 2021 Commission Plan favors Republicans for reasons other than traditional redistricting criteria and the Ohio Constitution's other requirements, as demonstrated by alternative maps presented to the Commission—which achieve greater partisan proportionality and are relatively similar, and in some cases slightly better, according to traditional redistricting criteria.

39. I have read the Complaint filed in this action and affirm that the factual allegations contained in paragraphs 50, 88, 98, 118, 125-128, 134-135, 137-141, 143 are true.

Jonathan Andrew Rodden
Jonathan Rodden

JURAT

STATE OF FLORIDA
COUNTY OF SAINT LUCIE

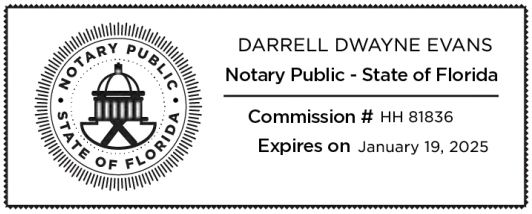
Sworn to before me this 24th day of September, 2021.

By Jonathan Andrew Rodden

Form of ID Produced: Driver's License

Darrell Dwayne Evans
Notary Public

Darrell Dwayne Evans



My commission expires 01/19/2025

Notarized online using audio-video communication

How to Verify This Transaction

Every Notarize transaction is recorded and saved for a minimum of five years. Whether you receive an electronic or printed paper copy of a Notarize document, you can access details of the transaction and verify its authenticity with the information below.

To get started, visit verify.notarize.com and enter this information:

Notarize ID:	EH5RD6JF
Access PIN:	J9X2VT

For more information on how to verify Notarize transactions, please visit:
support.notarize.com/notarize-for-signers/verifying-document-authenticity

Notarize

Exhibit A


©2021 CALIPER


11
2
18
23
21
24
27
32
1
13
28
26
22
29
33
12
19
31
16
3
25
15
30
5
6
20
10
4
7
17
8
9
14
©2021 CAL

Exhibit B

Frank LaRose
Ohio Secretary of State

Ohio House Districts 2012-2022

(As Adopted 2012)

For the most up-to-date and detailed information on each district, please contact the local county board of elections.

Last Revised 02/2018

Frank LaRose
Ohio Secretary of State

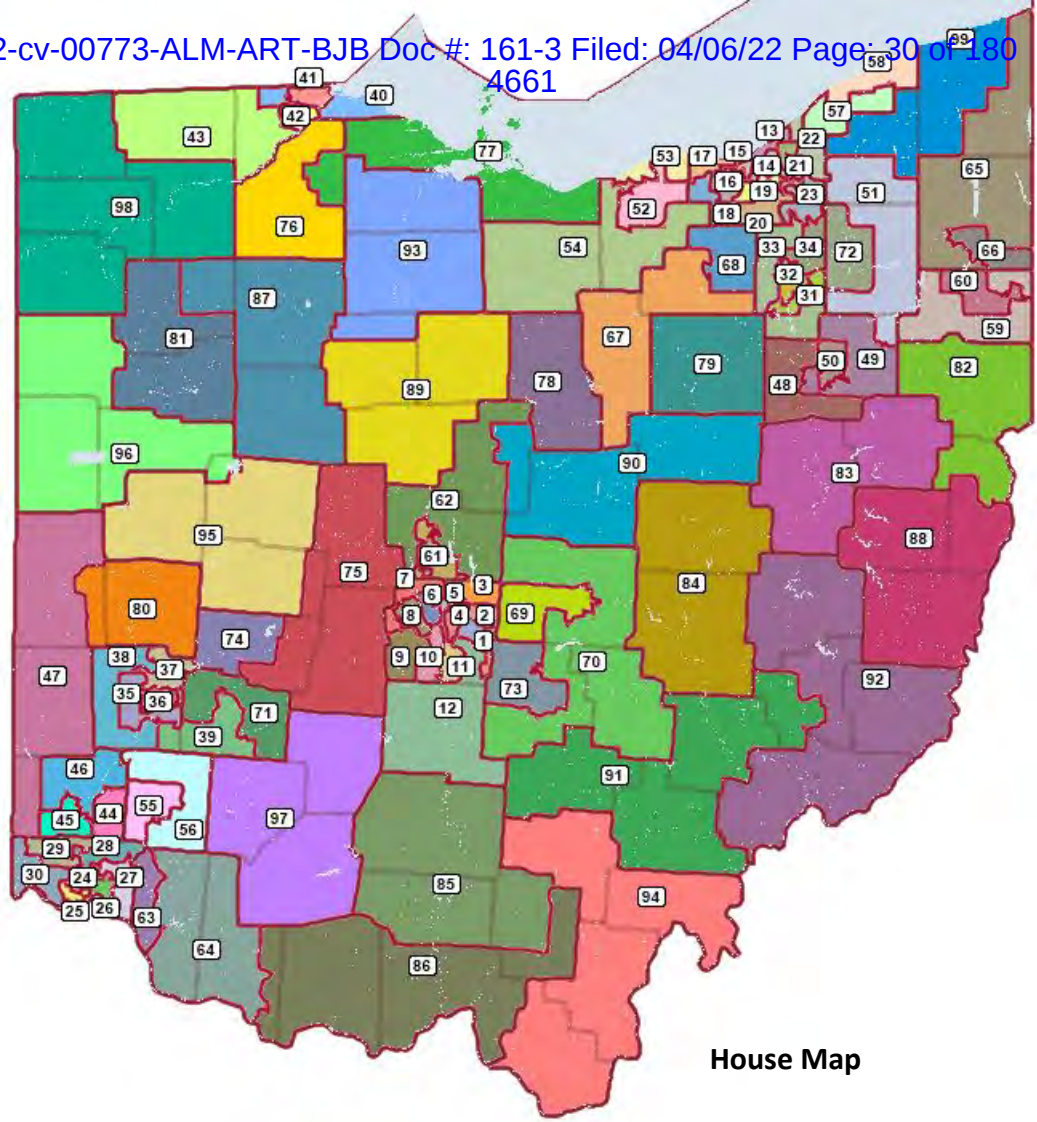
Ohio Senate Districts 2012-2022

(As Adopted 2012)

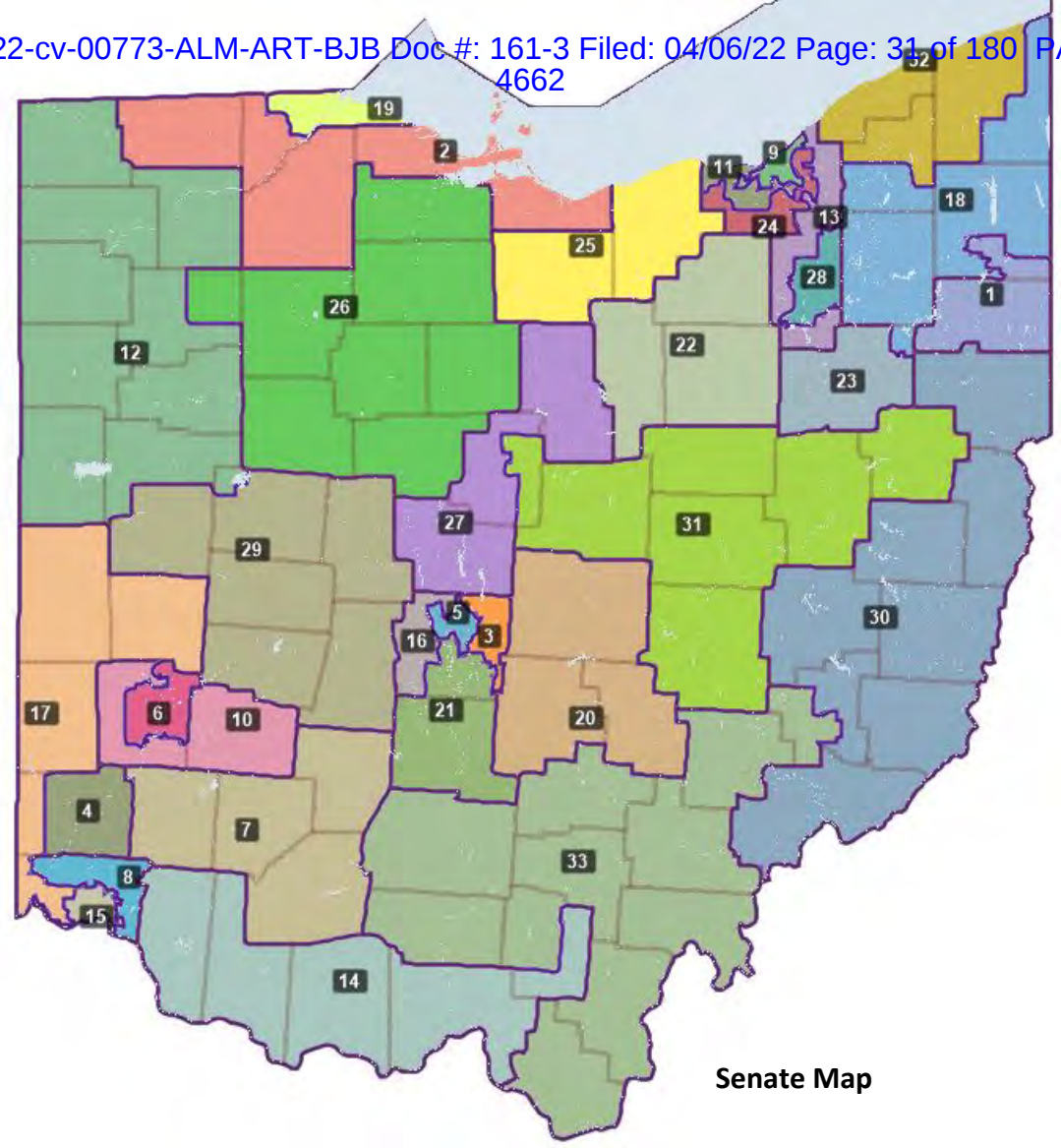
For the most up-to-date and detailed information on each district, please contact the local county board of elections.

Last Revised 02/2018

Exhibit C


41
40
42
43
77
98
76
93
54
53
17
15
14
21
16
19
23
52
18
20
33
34
72
68
32
31
87
81
67
79
50
49
82
89
78
48
96
90
83
62
95
61
75
7
6
5
3
88
84
80
8
4
2
69
74
1
38
37
9
10
11
70
47
35
36
73
92
71
12
39
46
91
55
45
44
56
97
29
28
30
24
27
85
94
25
26
63
64
86

House Map

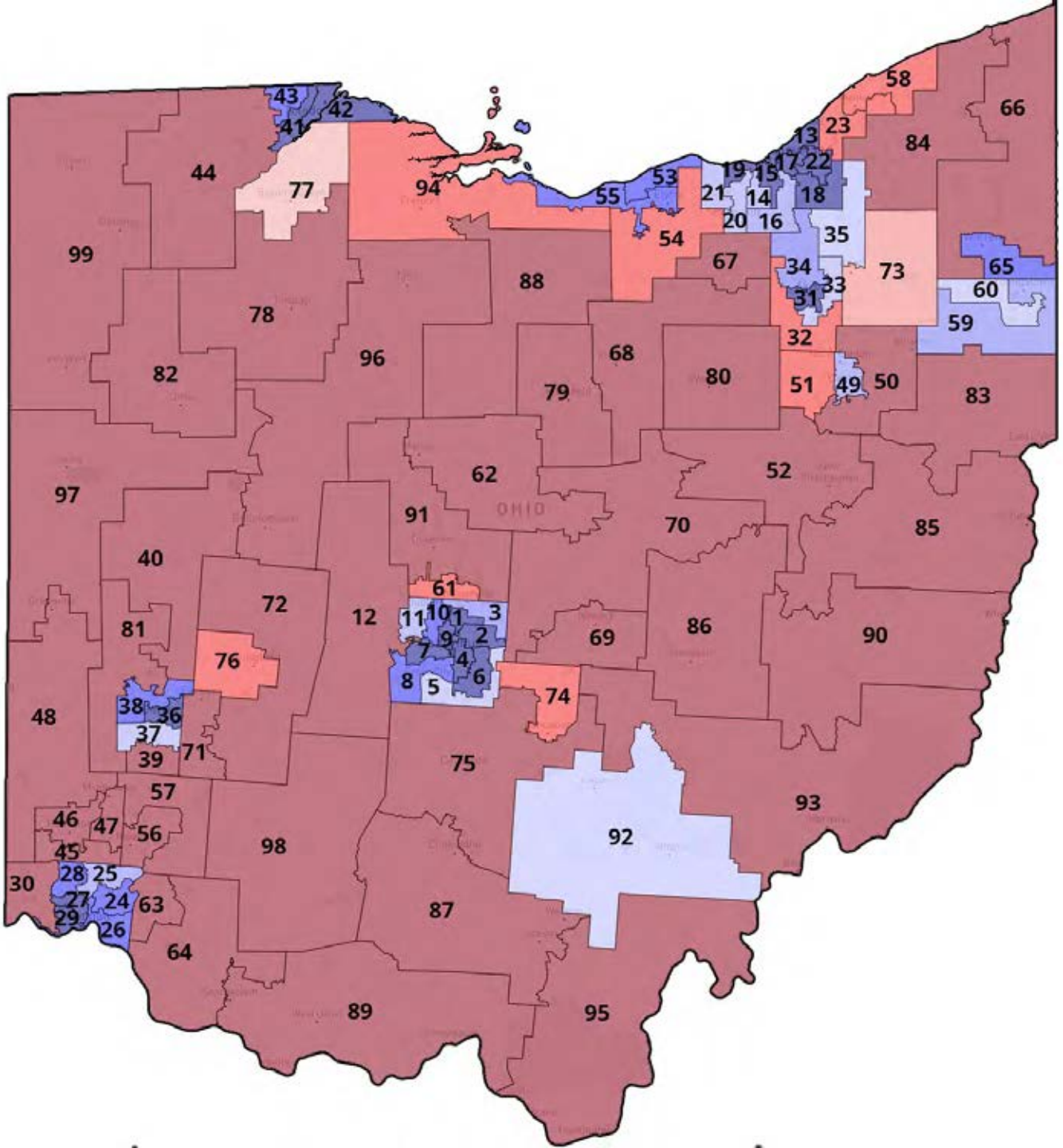

19
2
32
11
9
18
24
13
25
28
1
26
12
22
23
27
31
29
5
16
3
30
17
6
10
21
20
4
7
33
8
15
14

Senate Map

Exhibit D


40
41
42
82
43
89
76
83
81
86
87
85
84
12
60
61
98
80
75
71
68
8
9
11
7
3
4
6
1
2
10
5
73
74
97
69
50
96
95
39
35
38
36
37
70
55
46
44
54
45
91
94
29
28
25
30
27
62
63
92
93
90
57
56
99
19
20
13
14
21
16
15
22
23
51
52
17
65
64
53
31
34
72
66
33
58
59
32
48
67
78
49
47
79
77

Exhibit E


OHIO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99

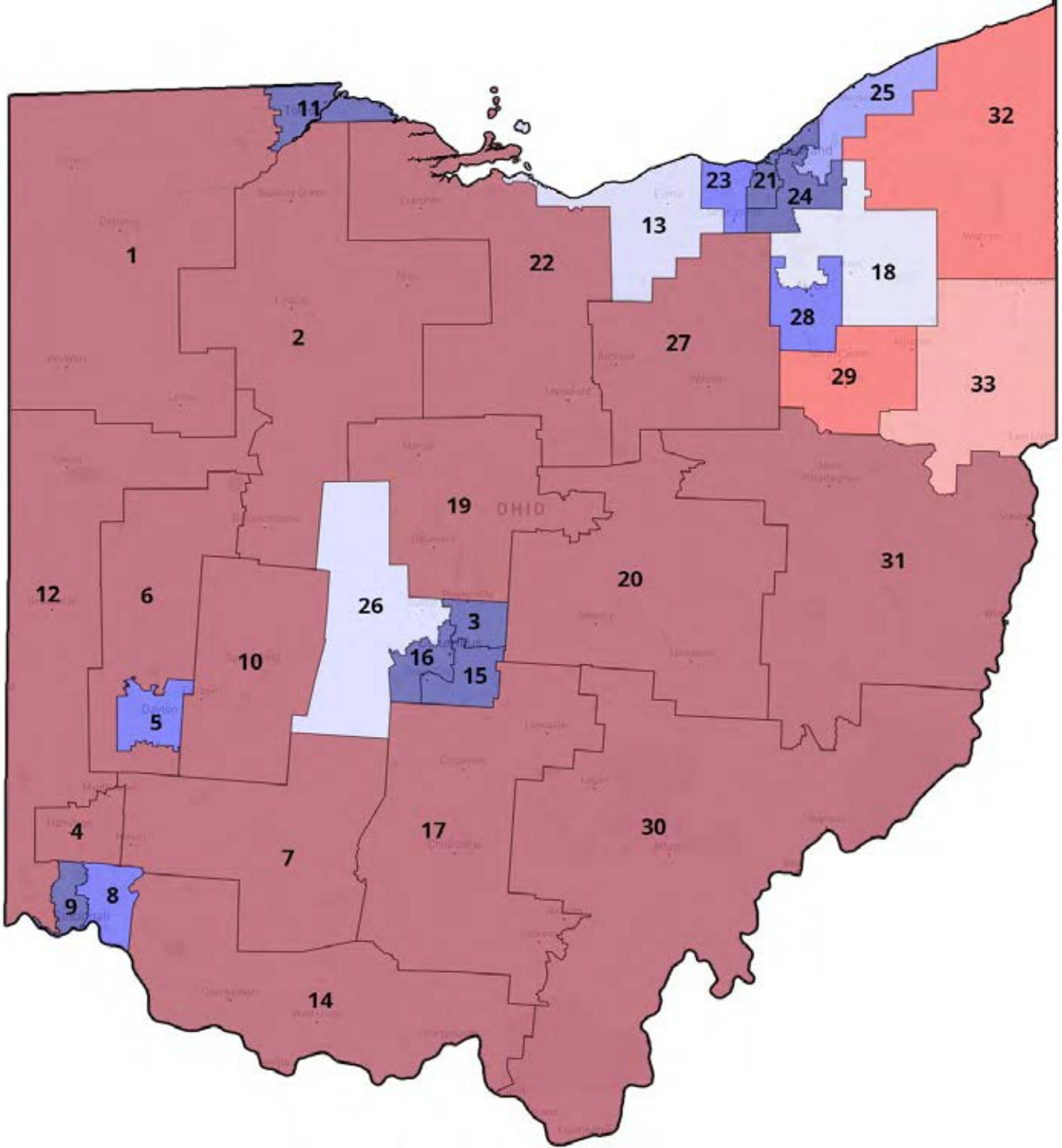

11
25
32
23
21
24
13
1
22
18
28
2
27
29
33
19
OHIO
31
12
6
20
26
3
10
16
15
5
4
17
30
7
9
8
14

Exhibit F

Article XI, Section 8(C)(2) Statement

Pursuant to Article XI, Section 8(C)(2) of the Ohio Constitution, the Ohio Redistricting Commission issues the following statement:

The Commission determined that the statewide preferences of the voters of Ohio predominately favor Republican candidates.

The Commission considered statewide state and federal partisan general election results during the last ten years. There were sixteen such contests. When considering the results of each of those elections, the Commission determined that Republican candidates won thirteen out of sixteen of those elections resulting in a statewide proportion of voters favoring statewide Republican candidates of 81% and a statewide proportion of voters favoring statewide Democratic candidates of 19%. When considering the number of votes cast in each of those elections for Republican and Democratic candidates, the statewide proportion of voters favoring statewide Republican candidates is 54% and the statewide proportion of voters favoring statewide Democratic candidates is 46%. Thus, the statewide proportion of voters favoring statewide Republican candidates is between 54% and 81% and the statewide proportion of voters favoring statewide Democratic candidates is between 19% and 46%. The Commission obtained publicly available geographic data for statewide partisan elections in 2016, 2018, and 2020. Publicly available geographic data for those elections was not available for elections in 2012 and 2014. Using this data, the Commission adopted the final general assembly district plan, which contains 85 districts (64.4%) favoring Republican candidates and 47 districts (35.6%) favoring Democratic candidates out of a total of 132 districts. Accordingly, the statewide proportion of districts whose voters favor each political party corresponds closely to the statewide preferences of the voters of Ohio.

The final general assembly district plan adopted by the Commission complies with all of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution. The Commission's attempt to meet the aspirational standards of Article XI, Section 6 of the Ohio Constitution did not result in any violation of the mandatory requirements of Article XI, Sections 2, 3 ,4, 5, and 7 of the Ohio Constitution.

Exhibit G

Jonathan Rodden

Stanford University
Department of Political Science
Encina Hall Central
616 Serra Street
Stanford, CA 94305

Phone: (650) 723-5219
Email: jrodden@stanford.edu
Homepage: http://www.jonathanrodden.com

Personal

Born on August 18. 1971, St. Louis, MO.

United States Citizen.

Education

Ph.D. Political Science, Yale University, 2000.

Fulbright Scholar, University of Leipzig, Germany, 1993–1994.

B.A., Political Science, University of Michigan, 1993.

Academic Positions

Professor, Department of Political Science, Stanford University, 2012–present.

Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

Associate Professor, Department of Political Science, Stanford University, 2007–2012.

Fellow, Center for Advanced Study in the Behavioral Sciences, Palo Alto, CA, 2006–2007.

Ford Career Development Associate Professor of Political Science, MIT, 2003–2006.

Visiting Scholar, Center for Basic Research in the Social Sciences, Harvard University, 2004.

Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

Publications

Books

Why Cities Lose: The Deep Roots of the Urban-Rural Divide. Basic Books, 2019.

Decentralized Governance and Accountability: Academic Research and the Future of Donor Programming. Co-edited with Erik Wibbels, Cambridge University Press, 2019.

Hamilton's Paradox: The Promise and Peril of Fiscal Federalism, Cambridge University Press, 2006. Winner, Gregory Luebbert Award for Best Book in Comparative Politics, 2007; Martha Derthick Award for lasting contribution to the study of federalism, 2021.

Fiscal Decentralization and the Challenge of Hard Budget Constraints, MIT Press, 2003. Co-edited with Gunnar Eskeland and Jennie Litvack.

Peer Reviewed Journal Articles

Who Registers? Village Networks, Household Dynamics, and Voter Registration in Rural Uganda, 2021, *Comparative Political Studies* forthcoming (with Romain Ferrali, Guy Grossman, and Melina Platas).

Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering, 2021, *Political Analysis* forthcoming (with Daryl DeFord Nick Eubank).

Who is my Neighbor? The Spatial Efficiency of Partisanship, 2020, *Statistics and Public Policy* 7(1):87-100 (with Nick Eubank).

Handgun Ownership and Suicide in California, 2020, *New England Journal of Medicine* 382:2220-2229 (with David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller).

Viral Voting: Social Networks and Political Participation, 2020, *Quarterly Journal of Political Science* (with Nick Eubank, Guy Grossman, and Melina Platas).

It Takes a Village: Peer Effects and Externalities in Technology Adoption, 2020, *American Journal of Political Science* (with Romain Ferrali, Guy Grossman, and Melina Platas). Winner, 2020 Best Conference Paper Award, American Political Science Association Network Section.

Assembly of the LongSHOT Cohort: Public Record Linkage on a Grand Scale, 2019, *Injury Prevention* (with Yifan Zhang, Erin Holsinger, Lea Prince, Sonja Swanson, Matthew Miller, Garen Wintemute, and David Studdert).

Crowdsourcing Accountability: ICT for Service Delivery, 2018, *World Development* 112: 74-87 (with Guy Grossman and Melina Platas).

Geography, Uncertainty, and Polarization, 2018, *Political Science Research and Methods* doi:10.1017/psrm.2018.12 (with Nolan McCarty, Boris Shor, Chris Tausanovitch, and Chris Warshaw).

Handgun Acquisitions in California after Two Mass Shootings, 2017, *Annals of Internal Medicine* 166(10):698-706. (with David Studdert, Yifan Zhang, Rob Hyndman, and Garen Wintemute).

Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders, 2015, *Election Law Journal* 14,4:1-15 (with Jowei Chen).

The Achilles Heel of Plurality Systems: Geography and Representation in Multi-Party Democracies, 2015, *American Journal of Political Science* 59,4: 789-805 (with Ernesto Calvo). Winner, Michael Wallerstein Award for best paper in political economy, American Political Science Association.

Why has U.S. Policy Uncertainty Risen Since 1960?, 2014, *American Economic Review: Papers and Proceedings* May 2014 (with Nicholas Bloom, Brandice Canes-Wrone, Scott Baker, and Steven Davis).

Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, 2013, *Quarterly Journal of Political Science* 8: 239-269 (with Jowei Chen).

How Should We Measure District-Level Public Opinion on Individual Issues?, 2012, *Journal of Politics* 74, 1: 203-219 (with Chris Warshaw).

Representation and Redistribution in Federations, 2011, *Proceedings of the National Academy of Sciences* 108, 21:8601-8604 (with Tiberiu Dragu).

Dual Accountability and the Nationalization of Party Competition: Evidence from Four Federatons, 2011, *Party Politics* 17, 5: 629-653 (with Erik Wibbels).

The Geographic Distribution of Political Preferences, 2010, *Annual Review of Political Science* 13: 297–340.

Fiscal Decentralization and the Business Cycle: An Empirical Study of Seven Federations, 2009, *Economics and Politics* 22,1: 37–67 (with Erik Wibbels).

Getting into the Game: Legislative Bargaining, Distributive Politics, and EU Enlargement, 2009, *Public Finance and Management* 9, 4 (with Deniz Aksoy).

The Strength of Issues: Using Multiple Measures to Gauge Preference Stability, Ideological Constraint, and Issue Voting, 2008. *American Political Science Review* 102, 2: 215–232 (with Stephen Ansolabehere and James Snyder).

Does Religion Distract the Poor? Income and Issue Voting Around the World, 2008, *Comparative Political Studies* 41, 4: 437–476 (with Ana Lorena De La O).

Purple America, 2006, *Journal of Economic Perspectives* 20,2 (Spring): 97–118 (with Stephen Ansolabehere and James Snyder).

Economic Geography and Economic Voting: Evidence from the U.S. States, 2006, *British Journal of Political Science* 36, 3: 527–47 (with Michael Ebeid).

Distributive Politics in a Federation: Electoral Strategies, Legislative Bargaining, and Government Coalitions, 2004, *Dados* 47, 3 (with Marta Arretche, in Portuguese).

Comparative Federalism and Decentralization: On Meaning and Measurement, 2004, *Comparative Politics* 36, 4: 481-500. (Portuguese version, 2005, in *Revista de Sociologia e Politica* 25).

Reviving Leviathan: Fiscal Federalism and the Growth of Government, 2003, *International Organization* 57 (Fall), 695–729.

Beyond the Fiction of Federalism: Macroeconomic Management in Multi-tiered Systems, 2003, *World Politics* 54, 4 (July): 494–531 (with Erik Wibbels).

The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World, 2002, *American Journal of Political Science* 46(3): 670–687.

Strength in Numbers: Representation and Redistribution in the European Union, 2002, *European Union Politics* 3, 2: 151–175.

Does Federalism Preserve Markets? *Virginia Law Review* 83, 7 (with Susan Rose-Ackerman). Spanish version, 1999, in *Quorum* 68.

Working Papers

Elections, Political Polarization, and Economic Uncertainty, NBER Working Paper 27961 (with Scott Baker, Aniket Baksy, Nicholas Bloom, and Steven Davis).

Federalism and Inter-regional Redistribution, Working Paper 2009/3, Institut d'Economia de Barcelona.

Representation and Regional Redistribution in Federations, Working Paper 2010/16, Institut d'Economia de Barcelona (with Tiberiu Dragu).

Chapters in Books

Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), in *Political Geometry*, edited by Moon Duchin and Olivia Walch, forthcoming 2021, Springer.

Keeping Your Enemies Close: Electoral Rules and Partisan Polarization, in *The New Politics of Insecurity*, edited by Frances Rosenbluth and Margaret Weir, forthcoming 2021, Cambridge University Press.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

The Political Economy of Federalism, 2006, in Barry Weingast and Donald Wittman, eds., *Oxford Handbook of Political Economy*, Oxford University Press.

Fiscal Discipline in Federations: Germany and the EMU, 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Online Interactive Visualization

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

Other Publications

Supporting Advanced Manufacturing in Alabama, Report to the Alabama Innovation Commission, Hoover Institution, 2021.

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

On the Migration of Fiscal Sovereignty, 2004, *PS: Political Science and Politics* July, 2004: 427–431.

Decentralization and the Challenge of Hard Budget Constraints, *PREM Note* 41, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies 32,7: 897-900.*

Fellowships, Honors, and Grants

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy

Introduction to Comparative Politics

Introduction to Political Science

Political Science Scope and Methods

Institutional Economics

Spatial Approaches to Social Science

Graduate

Political Economy

Political Economy of Institutions

Federalism and Fiscal Decentralization

Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Curcuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006–2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008–2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998–2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: September 23, 2021

Rodden Decl. Ex. C

IN THE SUPREME COURT OF OHIO

BRIA BENNETT, *et al.*, *Relators*, *v.* OHIO REDISTRICTING COMMISSION, *et al.*, *Respondents*.	Case No. 2021-1198

EVIDENCE OF BENNETT RELATORS

(Expert Affidavit of Dr. Jonathan Rodden & Exhibits)

Abha Khanna (PHV 2189-2021)
Ben Stafford (PHV 25433-2021)
ELIAS LAW GROUP
1700 Seventh Ave, Suite 2100
Seattle, WA 98101
akhanna@elias.law
bstafford@elias.law
T: (206) 656-0176
F: (206) 656-0180

Aria C. Branch (PHV 25435-2021)
Jyoti Jasrasaria (PHV 25401-2021)
Spencer W. Klein (PHV 25432-2021)
ELIAS LAW GROUP
10 G St NE, Suite 600
Washington, DC 20002
abranch@elias.law
jjasrasaria@elias.law
sklein@elias.law
T: (202) 968-4490
F: (202) 968-4498

Donald J. McTigue* (Ohio Bar No. 0022849)
**Counsel of Record*
Derek S. Clinger (Ohio Bar No. 0092075)
MCTIGUE & COLOMBO LLC
545 East Town Street

DAVE YOST
OHIO ATTORNEY GENERAL
Bridget C. Coontz (0072919)
Julie M. Pfeiffer (0069762)
30 E. Broad Street
Columbus, OH 43215
Tel: (614) 466-2872
Fax: (614) 728-7592
bridget.coontz@ohioago.gov
julie.pfeiffer@ohioago.gov

Counsel for Respondents
Governor Mike DeWine,
Secretary of State Frank LaRose, and
Auditor Keith Faber

W. Stuart Dornette (0002955)
Beth A. Bryan (0082076)
Philip D. Williamson (0097174)
TAFT STETTINIUS & HOLLISTER LLP
425 Walnut St., Suite 1800
Cincinnati, Ohio 45202-3957
T: (513) 381-2838
dornette@taftlaw.com
bryan@taftlaw.com
pwilliamson@taftlaw.com
Phillip J. Strach (PHV 25444-2021)

Columbus, OH 43215
dmctigue@electionlawgroup.com
dclinger@electionlawgroup.com
T: (614) 263-7000
F: (614) 368-6961

Counsel for Relators
Bria Bennett et al.

Thomas A. Farr (PHV 25461-2021)
John E. Branch, III (PHV 25460-2021)
Alyssa M. Riggins (PHV 25441-2021)
NELSON MULLINS RILEY & SCARBOROUGH LLP
4140 Parklake Ave., Suite 200
Raleigh, North Carolina 27612
phil.strach@nelsonmullins.com
tom.farr@nelsonmullins.com
john.branch@nelsonmullins.com
alyssa.riggins@nelsonmullins.com
T: (919) 329-3812

Counsel for Respondents
Senate President Matt Huffman and
House Speaker Robert Cupp

John Gilligan (Ohio Bar No. 0024542)
Diane Menashe (Ohio Bar No. 0070305)
ICE MILLER LLP
250 West Street, Suite 700
Columbus, Ohio 43215
John.Gilligan@icemiller.com
Diane.Menashe@icemiller.com

Counsel for Respondents
Senator Vernon Sykes and
House Minority Leader Emilia Sykes

DAVE YOST
OHIO ATTORNEY GENERAL
Erik J. Clark (Ohio Bar No. 0078732)
Ashley Merino (Ohio Bar No. 0096853)
ORGAN LAW LLP
1330 Dublin Road
Columbus, Ohio 43215
T: (614) 481-0900
F: (614) 481-0904
ejclark@organlegal.com
amerino@organlegal.com

Special Counsel to Ohio Attorney General
Dave Yost

Counsel for Respondent
Ohio Redistricting Commission

IN THE SUPREME COURT OF OHIO

Bria Bennett, *et al.*, **Relators,** **v.** **Ohio Redistricting Commission, *et al.*,** **Respondents.**	**Case No. 2021-1198** Original Action Filed Pursuant to Ohio Constitution, Article XI, Section 9(A) *[Apportionment Case Pursuant to S. Ct. Prac. R. 14.03]*

EXPERT AFFIDAVIT OF DR. JONATHAN RODDEN

I, Jonathan Rodden, having been duly sworn and cautioned according to law, hereby state that I am over the age of eighteen years and am competent to testify to the facts set forth below based on my personal knowledge and having personally examined all records referenced in this affidavit, and further state as follows:

I. INTRODUCTION AND SUMMARY

1. For the purpose of this report, I have been asked to examine whether and how the redistricting plan for the Ohio State House of Representatives and Ohio Senate, adopted by the Ohio Redistricting Commission on September 16, 2021, and attached as Exhibit A ("2021 Commission Plan"), addresses the standard set forth in Article XI, Section 6(B), namely, that "[t]he statewide proportion of districts whose voters, based on statewide state and federal partisan general election results during the last ten years, favor each political party shall correspond closely to the statewide preferences of the voters of Ohio."

2. I demonstrate that this "partisan proportionality" standard was clearly not met by the map adopted by the Ohio Redistricting Commission.

3. Furthermore, I have been asked to examine whether the partisan composition of the Commission's maps may have been a result of the Commission's need to satisfy other requirements of the Ohio Constitution: specifically, the requirements to avoid county and municipal splits, laid out in Article XI, Sections 3 and 4, and to attempt to draw compact districts, as set forth in Article XI, Section 6(C).

4. In order to answer this question, I do two things. First, I examine several additional maps that were available to the Commission, and to the public, prior to September 15. Second, I create my own alternative redistricting maps for the Ohio House and Senate, abiding by the rules set forth in the Ohio Constitution. I demonstrate that my alternative redistricting maps, like each of the alternative plans available to the Commission, were able to abide by the "partisan proportionality" requirement more closely while also abiding by the strict rules of

the Ohio Constitution regarding county and municipality splits, and while creating districts with similar or better compactness scores than those drawn by the Commission.

5. I was also asked to conduct a careful examination of the key geographic regions where the likely partisan outcomes associated with the 2021 Commission Plan were notably different from those of the alternative maps. In most instances, the alternative plans are more respectful of traditional redistricting criteria than the 2021 Commission Plan. Moreover, in some metro areas, the Commission's plan clearly achieves a lower anticipated Democratic seat share than the alternative plans by breaking up urban and suburban Democratic communities, including Black communities, and embedding them in districts where exurban and rural whites make up majorities. Moreover, some of the Commission's specific splits of urban counties are especially well-crafted to reduce the overall Democratic seat share in a region. And relative to the alternative plans, the Commission's plan often packs Democratic voters into overwhelmingly Democratic urban districts, which allows the Commission to carve out additional suburban and exurban districts with comfortable Republican majorities.

II. QUALIFICATIONS

6. I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. I am engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including ballots and election results at the level of polling places, individual records of registered voters, census data, and survey responses. I am also a senior fellow at the Stanford Institute for Economic Policy Research and the Hoover Institution. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Exhibit G.

7. In my current academic work, I conduct research on the relationship between the patterns of political representation, geographic location of demographic and partisan groups, and the drawing of electoral districts. I have published papers using statistical methods to assess political geography, balloting, and representation in a variety of academic journals including *Statistics and Public Policy, Proceedings of the National Academy of Science*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the *Virginia Law Review*, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics.* One of these papers was selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the best paper on political economy published in the last year, and another received an award from the American Political Science Association section on social networks. In 2021, I received a John Simon Guggenheim Memorial Foundation Fellowship, and received the Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations."

8. I have recently written a series of papers, along with my co-authors, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science*, *Election Law Journal*, and *Political Analysis*, and it has been featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I have recently completed a book, published by *Basic Books* in June of 2019, on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts. The book was reviewed in *The New York Times*, *The New York Review of Books*, *Wall Street Journal*, *The Economist*, and *The Atlantic*, among others.

9. I have expertise in the use of large data sets and geographic information systems (GIS), and I conduct research and teaching in the area of applied statistics related to elections. My PhD students frequently take academic and private sector jobs as statisticians and data scientists. I frequently work with geo-coded voter files and other large administrative data sets, including in recent papers published in the *Annals of Internal Medicine* and *The New England Journal of Medicine.* I have developed a national data set of geo-coded precinct-level election results that has been used extensively in policy-oriented research related to redistricting and representation.

10. I have been accepted and testified as an expert witness in several election law and redistricting cases: *Romo v. Detzner,* No. 2012-CA-000412 (Fla. Cir. Ct. 2012); *Mo. State Conference of the NAACP* v. *Ferguson-Florissant Sch. Dist.,* No. 4:2014-CV-02077 (E.D. Mo. 2014); *Lee v. Va. State Bd. of Elections,* No. 3:15-CV-00357 (E.D. Va. 2015); *Democratic Nat'l Committee et al. v. Hobbs et al.*, No. 16-1065-PHX-DLR (D. Ariz. 2016); *Bethune-Hill v. Virginia State Board of Elections*, No. 3:14-cv-00852-REP-AWA-BMK (E.D. Va. 2014); and *Jacobson et al. v. Lee*, No. 4:18-cv-00262 (N.D. Fla. 2018). I also worked with a coalition of academics to file Amicus Briefs in the Supreme Court in *Gill v. Whitford*, No. 16-1161, and *Rucho v. Common Cause*, No. 18-422. Much of the testimony in these cases had to do with geography, electoral districts, voting, ballots, and election administration. I recently worked as a consultant for the Maryland Redistricting Commission. I am being compensated at the rate of $550/hour for my work in this case. My compensation is not dependent upon my conclusions in any way.

III. DATA SOURCES

11. I have collected statewide election data for 2012 to 2020 from the Ohio Secretary of State. I also accessed precinct-level election results from the Ohio Secretary of State for statewide elections from 2016 to 2020 that were matched to 2020 Ohio vote tabulation districts by a team at Harvard University called the Algorithm-Assisted Redistricting Methodology Project.[1] Additionally, I accessed the proposed and adopted Ohio redistricting plans uploaded to the web page of the Ohio Redistricting Commission, true copies of which are attached as Exhibits A, C, D, and E.[2] For the analysis conducted in this report, I use three software packages: Stata, Maptitude for Redistricting, and ArcGIS Pro. In creating my maps,

[1] https://alarm-redist.github.io/posts/2021-08-10-census-2020/
[2] https://redistricting.ohio.gov/maps

I used the same U.S. Census redistricting data used by the Ohio Redistricting Commission, as archived in the "Ohio University Common and Unified Redistricting Database."[3]

IV. MEASURING PARTISAN PROPORTIONALITY

12. The Ohio Constitution instructs the Commission to use "statewide state and federal partisan general election results during the last ten years" to ascertain the "statewide preferences of the voters of Ohio" and attempt to draw a map in which the "statewide proportion of districts whose voters favor each party shall correspond closely" to those "statewide preferences."

13. As further discussed below, the only reasonable way to implement this notion of "statewide preferences," as ascertained from past elections to anticipated future seat shares, is via the proportion of votes received by the candidates for the two parties. That is to say, if a party won 50 percent of the average statewide vote in the relevant elections, a proposed map should favor that party—aggregating the results of those same elections—in somewhere very close to 50 percent of the seats.

14. The first task, then, is to establish this target from the last decade of statewide partisan election results. Figure 1 provides a visualization of Ohio statewide general election results from 2012 to 2020. Ohio is a hotly contested state with a tradition of split-ticket voting and significant swings from one year to another. The Democratic candidate won the presidential contest in 2012, but the Republican candidate won in 2016 and 2020. Ohio's U.S. Senate delegation is typically split between the parties, and other statewide elections are often very competitive, although 2014 was an exception, as was the 2016 U.S. Senate race.

15. Figure 1 reveals that while Ohio statewide elections have been mostly quite close over the last decade, Republican candidates have held a narrow advantage. To quantify this, Table 1 provides the raw data. Including all of the statewide general elections from 2012 to 2020, the Democratic share of the two-party vote (ignoring small parties and write-in candidates) was around 46 percent.

[3] https://www.redistricting.ohio.gov/resources

Figure 1: Statewide General Election Outcomes, Ohio, 2012-2020

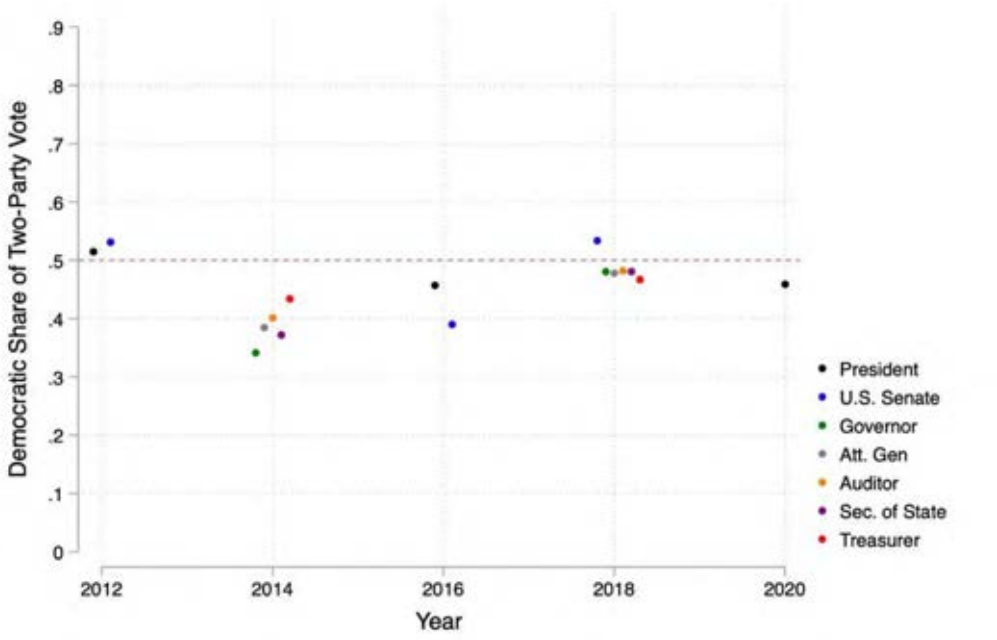


Table 1: Statewide General Election Outcomes, Ohio, 2012-2020

	Democratic Votes	Republican Votes	Other	Two-party Democratic Vote Share
2012 President	2,827,709	2,661,439	91,791	51.5%
2012 U.S. Senate	2,762,766	2,435,744	250,618	53.1%
2014 Governor	1,009,359	1,944,848	101,706	34.2%
2014 Att. Gen.	1,178,426	1,882,048		38.5%
2014 Auditor	1,149,305	1,711,927	143,363	40.2%
2014 Sec. of State	1,074,475	1,811,020	141,292	37.2%
2014 Treasurer	1,323,325	1,724,060		43.4%

2016 President	2,394,164	2,841,005	261,318	45.7%
2016 Senate	1,996,908	3,118,567	258,689	39.0%
2018 Senate	2,358,508	2,057,559	1,017	53.4%
2018 Governor	2,070,046	2,235,825	129,949	48.1%
2018 Att. Gen.	2,086,715	2,276,414		47.8%
2018 Auditor	2,008,295	2,156,663	175,962	48.2%
2018 Sec. of State	2,052,098	2,214,273	103,585	48.1%
2018 Treasurer	2,024,194	2,308,425		46.7%
2020 President	2,679,165	3,154,834	88,203	45.9%
Sum, all elections	30,995,458	36,534,651	1,747,493	**45.9%**
Sum, 2016-2020	19,670,093	22,363,565	1,018,723	**46.8%**

16. Determining the proportion of districts that favor each party, based on consideration of the relevant elections identified in Article XI, Section 6, requires an aggregation of the precinct-level results of these past elections to the boundaries of a map's proposed districts. However, precinct-level election results linked with geo-spatial boundaries were not available for the 2012 and 2014 elections, as the Commission itself acknowledged in its Article XI, Section 8(C)(2) Statement, attached as Exhibit F. Thus, Table 1 also sets forth that the two-party Democratic vote share in the 2016, 2018, and 2020 general elections was around 47 percent.

17. Accordingly, using the full statewide election results from 2012 to 2020, the statewide preferences of Ohio voters must be translated into state legislative maps in which 45.9 percent of seats favor Democrats and 54.1 percent of seats favor Republicans. Since there are 99 seats in the Ohio House of Representatives, a statewide vote share of 45.9 percent would be associated with 45.44 Democratic seats, which rounds down to 45 seats. Similarly, a 45.9 percent vote share would be associated with about 15.15 Democratic seats in the 33-member Ohio Senate, which rounds down to 15 seats.

18. I have aggregated the precinct-level results of each election from 2016 to 2020 included in Table 1 to the level of the districts in the 2021 Commission Plan. For each district, I calculate the average Democratic share of the votes received by the candidates of the two major parties across each of these elections. I then ascertain the number of districts in which this quantity is greater than 50 percent. Using this technique, I determine that the 2021 Commission Plan

produced 37 majority-Democratic House seats and 62 majority-Republican House seats, as shown in Table 2 below. In the Senate, the 2021 Commission Plan produced 10 majority-Democratic Senate seats and 23 majority-Republican seats. This is a gap of 8 House seats and 5 Senate seats between the Democratic-leaning seats produced by the 2021 Commission Plan and the seat share that would be proportionate to the statewide Democratic vote share.

19. Notably, the partisanship of the Commission's maps is not very different from that of the current maps, adopted in 2011 and attached as Exhibit B. The current breakdown of the General Assembly under the 2011 maps is as follows: 35 Democrats and 64 Republicans in the House; 8 Democrats and 25 Republicans in the Senate.

20. In addition to this examination of seats above and below the 50 percent cut-point, it is also useful to examine how many of the Democratic- and Republican-leaning seats are razor-thin majorities, and how many are more comfortable majorities. I count the number of seats where the average Democratic share of the vote for the two major parties was less than 48 percent—let us call these expected Republican seats. And I count the number of seats where the average Democratic share of the vote for the two major parties was greater than 52 percent—let us call these expected Democratic seats. Finally, I count the number of seats that we might call "toss-ups," where the average Democratic vote share was between 48 percent and 52 percent.

21. As set forth in Table 2 below, in the 2021 Commission Plan, all of the majority-Republican House seats are greater than 52 percent Republican. Of the 37 majority-Democratic seats, only 32 are greater than 52 percent Democratic. All 5 of the toss-up seats are slim Democratic majorities. As set forth in Table 3, in the Commission's Senate plan, there are 21 expected Republican seats, 9 expected Democratic seats, and 3 toss-ups, of which 1 is a slim Democratic majority and 2 are slim Republican majorities. As explained further below, by generating a large number of seats with comfortable Republican majorities, the Commission has generated plans that would provide the Republican Party with a majority of seats even in the event of a comfortable Democratic statewide victory.

22. In its Article XI, Section 8(C)(2) Statement, the Commission explained its ostensible attempt to comply with the "partisan proportionality" requirement in the Ohio Constitution. In this statement, the Ohio Redistricting Commission offers an unsound implementation of the constitutional requirement, suggesting that in addition to the vote share, an equally reasonable way to measure "statewide preferences" is by calculating the share of all elections in the last decade in which each party received more votes than the other party. This is a flawed way of characterizing voter preferences in general, but especially when the purpose is to evaluate seat shares. With this interpretation, a party that always wins 50.01 percent of the vote in general elections would be viewed as having 100 percent of the "statewide preference," entitling it to draw a map that gave itself all the seats, a patently absurd outcome.

23. Consider, for example, a situation in which the United States adopted Ohio's constitutional amendment for U.S. House of Representatives districts. The only nationwide elections are presidential elections, for which Democratic candidates have won a majority of the popular vote in each election since 2004, although many of these elections were extremely close. By the Commission's logic, voters preferred Democratic candidates 100 percent of the time, and

would therefore be entitled to 100 percent of the seats in Congress. Similarly, the Commission's measurement would suggest that Minnesota voters prefer 100 percent of their elected officials to be Democrats, simply because Democrats have won 100 percent of the statewide partisan races in the past decade—even though those elections were relatively close, and control of the state legislature in Minnesota has been closely divided throughout that period. The same would be true in California, even though more than 6 million people in that state voted for former President Donald Trump in the 2020 presidential election. This is simply not a tenable methodology for determining voter preferences.

24. In the vast academic literature on voter preferences and seats, I have never encountered the notion that the seat share should correspond to the share of past elections in which a party "won," or received a plurality of votes. Perhaps the foundational work in this literature is a paper published in 1950 by Kendall and Stuart,[4] exploring the vote share in each election as a measure of voter preferences and examining the transformation of those votes to seats in the British Parliament. Then, Gudgin and Taylor published a book in 1979 that explored the geography of voter preferences, as ultimately expressed through vote shares in specific elections, and the transformation of those votes to seats.[5] Next, a variety of books and articles by Ronald Johnston and collaborators, and more recently, Gary King and collaborators, further developed these insights about preferences, votes, and seats.[6] A recent analytical review of the resulting literature is provided in a 2020 article by Katz, King, and Rosenblatt.[7]

25. In this entire literature, the basic starting point is to conceptualize vote shares in specific elections as indicators of voter preferences. These works explore how the geography of preferences, combined with the specific electoral districting plan, combine to translate votes into seats in the legislature. All of this literature shares a basic normative notion that 50 percent of the votes should translate into 50 percent of the seats, and that in a two-party system, there should be symmetry in the way a redistricting plan treats the two parties.

26. Partisan symmetry means that if the two parties' vote shares were reversed, their seat shares would be similarly reversed. For instance, imagine a redistricting plan in which Party A, if it received 52 percent of the votes, could anticipate 55 percent of the seats, due the fact that it was victorious in several of the most competitive seats. Partisan symmetry means that an electoral wave in favor of Party B, such that Party B now received 52 percent of the votes, would also provide Party B with a similar 55 percent seat share. However, if Party A can manipulate the redistricting process to produce partisan asymmetry, it might produce an unusually large number of seats with comfortable, but not overwhelming, majorities for Party

---

[4] M. Kendall and A. Stuart, 1950, "The Law of Cubic Proportion in Election Results," *British Journal of Sociology* 1,3:183,96.

[5] Gudgin G, PJ Taylor PJ. 1979*, Seats, Votes, and the Spatial Organisation of Elections*. London: Pion.

[6] See PJ Taylor Ronald Johnston, 1979*, Geography of Elections*. London: Croom Helm; and Robert Browning and Gary King, 1987, "Seats, Votes, and Gerrymandering: Estimating Representation and Bias in State Legislative Redistricting." *Law and Policy* 9,3:305-322.

[7] J. Katz, G. King, and E. Rosenblatt, 2020, "Theoretical Foundations and Empirical Evaluations of Partisan Fairness in District-Based Democracies," *American Political Science Review* 114,1: 164-178.

A, thus building a levy to withstand a wave in favor of Party B. In the asymmetric scenario, then, 52 percent of the vote for Party B would be insufficient to provide it with a legislative majority.

27. This literature on partisan proportionality and, relatedly, partisan symmetry, does sometimes examine multiple elections in order to examine the impact of different vote shares and different geographies of support over time on the transformation of votes to seats, but the starting point remains that vote share is the means to determine partisan preference. At no point in this literature do scholars conceptualize the notion of partisan proportionality or symmetry as pertaining to the relationship between the seat share and the number of overall pluralities achieved over a period of time.

28. In short, the notion of proportionality employed by academics is no different from that employed by pundits, politicians, and the mass public: it pertains to the relationship between the vote share and the seat share. Surely this is also the notion invoked by the Ohio Constitution.

29. Thus, the Commission was tasked with attempting to draw a map in which around 54 percent of the seats are anticipated to produce Republican majorities. Instead, they have drawn a House map where Republicans can expect comfortable majorities in 63 percent of the seats. And they have drawn a Senate map in which Republicans can expect majorities in a stunning 70 percent of seats.

30. Neither the academic literature nor common usage in political discourse could suggest that this result "closely corresponds" to the "statewide preferences" of voters. In fact, the lack of correspondence between votes and seats is even more profound than suggested by the simple statewide averages discussed thus far. As mentioned above, an important focus of the academic literature on votes and seats is the notion of "symmetry." In a two-party system, what would happen to the seat shares if the vote shares of the two parties reversed?

31. Fortunately, recent Ohio electoral history gives us an opportunity to examine just that scenario. In 2018, the Republican candidate for Treasurer, Robert Sprague, won 53.3 percent of the two-party vote. If we aggregate the precinct-level votes in the 2018 Treasurer election to match the 2021 Commission's Ohio House of Representatives districts, Mr. Sprague would win majorities in 64 percent of the districts. That is to say, based on the 2018 votes for Treasurer, the Republican seat share is more than 10 percentage points higher than the Republican vote share.

32. On the same day, November 6, 2018, on the same ballot, the Democratic candidate for U.S. Senate, Sherrod Brown, received slightly more votes than Mr. Sprague, ending up with 53.4 percent of the two-party vote. Yet if we aggregate these U.S. Senate votes up to match the 2021 Commission's House districts, Senator Brown would receive majorities in only 49.5 percent of the seats. With relatively similar statewide victories of just over 53 percent, these two candidates' vote shares translate to dramatically different outcomes in terms of seats in the 2021 Commission House map. The Republican candidate's 53.3 percent win translates to a supermajority of seats, while the Democratic candidate's slightly *higher* 53.4 percent win translates to a *minority* of seats.

33. This example reveals the troubling extent to which the 2021 Commission Plan falls short of any notion of correspondence between voters' preferences and legislative seats. Because so many of the Republican majorities in districts drawn by the Commission are comfortable, even if the Democrats win a comfortable majority of votes—on the order of 53.4 percent—they still cannot expect to serve in the legislative majority.

V. COMPARING THE COMMISSION'S MAPS TO ALTERNATIVE MAPS

34. It is clearly the case that the 2021 Commission did not adopt maps in which the party seat share closely corresponds with the vote share in relevant statewide elections under any reasonable interpretation of the Ohio Constitution's partisan fairness requirement. But one might imagine that the partisan composition of the Commission's maps was a function of constraints imposed by other constitutional requirements related to traditional redistricting principles that the Commission understood to be more important. Perhaps the Commission *attempted* to abide by Article XI, Section 6(B), but the job was simply too difficult.

35. In fact, the next line after the "partisan proportionality" clause dictates that the Commission "shall attempt" to draw compact districts. One might wonder whether the Commission found it difficult to achieve partisan proportionality because of a tension between that goal and the additional goal of drawing compact districts. Moreover, the Constitution requires that the Commission use entire counties, municipal corporations, and townships as the building blocks of districts to the extent possible. Counties with population greater than that which is sufficient for a single district must spill over into only a single additional district. The Commission must also endeavor not to split counties more than once, and not to split more than one municipality per district. Conceivably, efforts to abide by requirements like these could make it difficult for a map-drawer to achieve partisan proportionality despite a concerted effort to do so.

36. A simple and effective way to examine such assumptions is to analyze other maps that were made available to the Commission before it finalized its own maps. Did those maps come closer to achieving partisan proportionality while abiding by the same rules and achieving similar benchmarks with respect to the traditional redistricting principles emphasized in the Constitution? If so, one cannot accept the claim that the Commission was forced by restrictive rules into drawing maps with a large advantage for one party.

37. Specifically, I examined a map introduced by Senator Sykes on September 2, attached as Exhibit C, and another map introduced by Senator Sykes on September 15, attached as Exhibit H. An additional map was proposed by a group called the "Ohio Citizens Redistricting Commission" and is attached as Exhibit E. Based on my review and to the best of my knowledge, with the possible exception of the Sykes September 2 map, discussed further below, these maps are materially compliant with the line-drawing rules explained above, as set forth in Article XI, Sections 3 and 4 of the Ohio Constitution.

38. In addition to examining maps produced by others, I have produced my own redistricting plan for the Ohio House and Senate. By drawing my own maps, I was able to gain a full appreciation for the challenges and trade-offs associated with the Ohio Constitution's

redistricting rules, and can explain how I resolved them, and with what implications for partisanship and respect for traditional redistricting criteria.

39. My approach was to begin by creating a complete plan for the House of Representatives and then assemble groups of three House districts in order to produce a Senate plan. However, this approach ran into a roadblock since most reasonable configurations of House districts cannot produce a valid Senate plan. Article XI, Section 4(B)(2) of the Ohio Constitution states that "Counties having less than one senate ratio of representation, but at least one house of representatives ratio of representation, shall be part of only one senate district." In Northeast Ohio, it is extremely difficult to comply with Section 4(B)(2) in conjunction with the immediately preceding 4(B)(1), which states that "a county having at least one whole senate ratio of representation shall have as many senate districts wholly within the boundaries of the county as it has whole senate ratios of representation. Any fraction of the population in excess of a whole ratio shall be a part of only one adjoining senate district."

40. This is complex in Northeast Ohio because both Cuyahoga and Summit Counties have well beyond the population of a single extra house district that must find a home in an adjoining district, and many surrounding House districts are unavailable as partners because of the prohibition on splits of medium-sized counties and the position of all relevant counties in the corner of the state. A rather unsatisfactory way to solve this problem is to severely under-represent the people of Northeast Ohio, over-populating virtually every district in this part of the state as close as possible to the 5 percent constraint, and under-populating many districts throughout the rest of the state. I came to the conclusion that this is the only way to configure districts in the House of Representatives in a way that allows for Senate districts that *strictly* comply with Article XI, Section 4 in Northeast Ohio. I thus configured House districts in Northeast Ohio with a sole focus on finding an arrangement that would yield valid Senate districts.

41. This same basic approach, with dramatic over-population of Cuyahoga and other Northeast Ohio districts, was also taken in the 2021 Commission Plan, the Citizens' Commission Plan, and the Sykes 9/15 Plan. It is not entirely clear, however, that the Ohio Constitution *requires* this unusual type of harm to the voters of Northeast Ohio, since Article XI, Section 4(B)(3) instructs the commission to "commit the fewest possible violations" in the event that "it is not possible to draw representative districts that comply with all of the requirements of this article." The Sykes map of September 2, 2021 does not strictly comply with Article XI, Section 4, because it splits Trumbull County (between districts 1 and 18), even though it is in the population range of counties for which splits should usually be avoided. The Sykes 9/2 map is, thus, a useful reference point as a map that takes a slightly different approach to interpreting Article XI, Section 4: one that purchases fair representation for Northeast Ohio at the rather minute cost of a single county split. In contrast, the Sykes 9/15 plan removes the offending county split and reconfigures both the House and Senate maps to under-represent Northeast Ohio.

42. After resolving the dilemma of Northeast Ohio, my approach was to follow the rules laid out by the Ohio Constitution, beginning with House districts, and, within the strict constraints regarding municipal and county splits, also attempt to maximize compactness and minimize county splits. These goals are sometimes in conflict. In some regions of Ohio, the population

sizes and geographic arrangement of counties mean that in order to keep counties together, one must tolerate some non-compact districts. In general, since the Constitution calls for the use of entire counties as building blocks for districts whenever possible, my approach was to prioritize the minimization of county splits when drawing (and refining) first my House and then my Senate plan, while also trying to make decisions that facilitated a relatively compact set of districts for any given region.

43. After achieving these things, I considered an additional factor in metro areas. I attempted to avoid drawing districts that excessively packed members of one of the parties in a way that would undermine their representation. Moreover, when drawing district lines, I attempted to avoid splitting groups of geographically proximate co-partisans in a way that would prevent them from forming a majority.

44. I did not deviate from the application of traditional redistricting principles in order to help or harm one of the political parties. For instance, in Toledo, it is possible to further "unpack" urban Democrats and produce an additional majority-Democratic district, but this would have created a rather non-compact district that would have also intentionally split geographically proximate Republican communities. Elsewhere, in a couple of places it is possible within the rules of the Ohio Constitution to string together far-flung Democratic industrial and college towns. I avoided drawing districts in this manner. Rather, within the confines of the constitutional rules and the application of traditional redistricting criteria, I simply made a conscious effort to avoid drawing districts that would have the effect of clearly packing or cracking geographically proximate co-partisans.

45. I paid no attention to racial data when drawing my maps. However, after completing my redistricting plans, I checked for compliance with the Voting Rights Act as follows. First, I used precinct-level data on race and partisanship, using the same statewide general election races detailed in Table 1 above and, using ecological inference, ascertained whether racially polarized voting was present within each of Ohio's major metropolitan counties. Next, in counties where racially polarized voting was present, I made sure that, under my alternative Senate and House plans, candidates of choice for Black voters in statewide elections had indeed been victorious in the relevant districts in my redistricting plan. In each metro area with a large Black community and clear evidence of racially polarized voting—specifically Akron, Cincinnati, Dayton, and Toledo—this was clearly the case. I thus did not make any changes to my alternative plans to ensure compliance with the Voting Rights Act.

46. For my maps, attached as Exhibit I, for each of the alternative maps presented to the Commission, and for the Commission's proposed maps (attached as Exhibit D), I have produced compactness scores for the districts to assess the maps' compliance with Article XI, Section 6(C). I have included Reock, Polsby-Popper, and Convex Hull compactness measures, each of which takes a somewhat different approach to the notion of district compactness.

47. Although the Ohio Constitution does not specify the optimal number of county splits, I have also calculated the number of county splits generated by each plan. I define a county split in the same way as the Ohio Constitution. For example, Franklin County is not considered to be split in a House of Representatives plan if 11 districts are formed that fit completely within

the county, and no fragment of any district spills over the county boundary. Moreover, a county that is kept intact but joined together with other "split" counties is not considered a split county. A county is only considered to be split if some part—but not all—of its territory is joined with territory from another county in the formation of a district.

Table 2: Summary Information, Ohio House of Representative Plans Submitted to Ohio Redistricting Commission

	Commission 9/15	Commission 9/9	Sykes 9/2	Sykes 9/15	Citizens 9/10	Rodden
Average compactness scores						
(Higher scores = more compact)						
Reock	0.40	0.40	0.40	0.39	0.40	0.41
Polsby-Popper	0.30	0.30	0.31	0.29	0.34	0.36
Area/Convex Hull	0.74	0.73	0.74	0.72	0.76	0.79
Number of split counties	33	33	30	33	43	32
# of seats with average two-party Democratic vote share >.5	37	32	44	42	43	43
Expressed as percentage of seats	37.4%	32.3%	44.4%	42.4%	43.4%	43.4%
# of seats with average two-party Republican vote share >.5	62	67	55	57	56	56
Expressed as percentage of seats	62.6%	67.7%	55.6%	57.6%	56.6%	56.6%
Distance from proportional seat allocation (seats)	8	13	1	3	2	2
Expressed as percentage of seats	8.1%	13.1%	1.0%	3.0%	2.0%	2.0%

# of seats with average two-party Democratic vote share >.52	32	31	41	38	42	40
Expressed as a percentage of seats	32.3%	31.3%	41.4%	38.4%	42.4%	40.4%
# of seats with average two-party Democratic vote share <.48	62	63	54	54	54	56
Expressed as percentage of seats	62.6%	63.6%	54.5%	54.5%	54.5%	56.6%
# of seats with average two-party Democratic vote share between .48 and .52	5	5	4	6	3	3
Expressed as percentage of seats	5.1%	5.1%	4.0%	6.1%	3.0%	3.0%

48. In Table 2, I provide compactness scores and information on county splits for each of the Ohio House of Representatives plans I analyzed. Next, using the same technique described above, I include the number of majority-Democratic districts, majority-Republican districts, expected Democratic districts, expected Republican districts, and toss-up districts that would be produced by each plan.

49. First, in terms of compactness, Senator Sykes' initial plan was slightly more compact than the Commission's final September 15 plan, but his revised plan, after reconfiguring Northeast Ohio, was slightly less compact. The plan produced by the Citizens' Commission was on average more compact according to both the Polsby-Popper and Convex Hull scores. The House map I produced was more compact by every measure than those produced by the Commission, Senator Sykes, and the Citizens' Commission.

50. The Commission's House of Representatives Plan splits 33 counties. The Citizens' Commission splits a greater number of counties (43) than does the Ohio Redistricting Commission's, while Senator Sykes' original plan splits fewer counties (only 30), and his revised plan is similar to the Commission's on this dimension. Likewise, my alternative plan splits 32 counties.

51. Next, let us examine the partisan outcomes associated with these alternative plans. The relevant information is also contained in Table 2. The initial plan submitted by Senator Sykes came very close to achieving partisan proportionality. It produced 44 majority-Democratic seats and 55 majority-Republican seats—a difference from proportionality of only 1 seat. My alternative plan, as well as the plan produced by the Citizens' Commission, produced 43 Democratic seats and 56 Republican seats—a difference from proportionality of only 2 seats. Senator Sykes's revised plan produced 42 majority-Democratic seats—a difference from proportionality of 3 seats. Again, in contrast to my alternative plan and these other plans, which came very close to achieving partisan proportionality, the Ohio Redistricting Commission's final plan deviated 8 seats from true proportionality.

52. In short, the plans introduced by Senator Sykes and the Citizens' Redistricting Commission are relatively similar to the Commission's Plan in their deference to traditional redistricting criteria emphasized in the Ohio Constitution—and my alternative plan is more compact on average—but each of these plans also comes much closer to achieving the required partisan proportionality. This indicates that the failure of the 2021 Commission Plan to achieve partisan proportionality and its overall favorability to Republicans were intentional choices, rather than natural outgrowths of other constraints.

53. Next, let us undertake a similar comparison of the Ohio Redistricting Commission's Senate maps with these alternative maps. The key information is contained in Table 3. Once again, the plans presented by Senator Sykes demonstrated a similar level of average compactness to the Commission's plan on each of the three metrics I considered. And again, my alternative plan, along with the plan produced by the Citizens' Commission, were clearly more compact than the Commission plan. Relative to the Commission's Senate map, my alternative map split 2 additional counties, the Sykes maps split 3 additional counties, and the Citizens' map split 5 additional counties.

54. The Commission's Senate map produced only 10 majority-Democratic seats, and 23 majority-Republican seats. In contrast, both the original Sykes Senate map and the Citizens' Commission Senate map produced 14 Democratic seats and 19 Republican seats. The revised Sykes map produced 13 Democratic seats and 20 Republican seats. My alternative map produced 15 Democratic seats and 18 Republican seats. Recall that the target set forth by the Constitution was 15 Democratic seats, meaning that 2 of these plans came within a single seat of the target, and 1 achieved proportionality. Again, as with the House of Representatives, these alternative maps demonstrate that, for the Senate as well, it is possible to abide both by the Ohio Constitution's traditional redistricting requirements as well as its partisan proportionality requirement. The fact that the Commission's map so strongly favors the Republican Party is the result of discretionary choices made by the Commission and reflects that the Commission did not attempt to achieve partisan proportionality.

Table 3: Summary Information, Ohio Senate Plans Submitted to Ohio Redistricting Commission

	Commission 9/15	Commission 9/9	Sykes 9/2	Sykes 9/15	Citizens 9/10	Rodden
Average compactness scores						
(Higher scores = more compact)						
Reock	0.39	0.39	0.39	0.38	0.43	0.44
Polsby-Popper	0.31	0.31	0.31	0.31	0.37	0.37
Area/Convex Hull	0.73	0.72	0.73	0.74	0.78	0.78
Number of split counties	13	13	16	16	18	15

# of seats with average two-party Democratic vote share >.5	10	9	14	13	14	15
Expressed as percentage of seats	30.3%	27.3%	42.4%	42.4%	42.4%	45.5%
# of seats with average two-party Republican vote share >.5	23	24	19	20	19	18
Expressed as percentage of seats	69.7%	72.7%	57.6%	60.6%	57.6%	54.5%
Distance from proportional seat allocation (seats)	5	6	1	2	1	0
Expressed as percentage of seats	15.2%	18.2%	3.0%	6.1%	3.0%	0
# of seats with average two-party Democratic vote share >.52	9	8	13	12	12	12
Expressed as a percentage of seats	9.1%	8.1%	13.1%	12.1%	12.1%	12.1%
# of seats with average two-party Democratic vote share <.48	21	21	18	19	18	18
Expressed as percentage of seats	63.6%	63.6%	54.5%	57.6%	54.5%	54.5%
# of seats with average two-party Democratic vote share between .48 and .52	3	4	2	2	3	3
Expressed as percentage of seats	3.0%	4.0%	2.0%	2.0%	3.0%	3.0%

VI. WHY DID THE OHIO REDISTRICTING COMMISSION FALL SO FAR SHORT OF PROPORTIONALITY?

55. It is clear that the 2021 Commission Plan produces outcomes that are at odds with the partisan fairness required by the Ohio Constitution, while alternative plans achieve near-proportional outcomes. Next, it is useful to gain a better understanding of how this happened by examining the specific choices that led to such striking differences in the partisanship of the Commission's maps relative to the alternative maps. This section examines the differences between the maps in more detail, focusing first on aggregate data, and then drilling down into the individual regions where different outcomes are notable.

The Geographic Distribution of Partisanship Across Districts

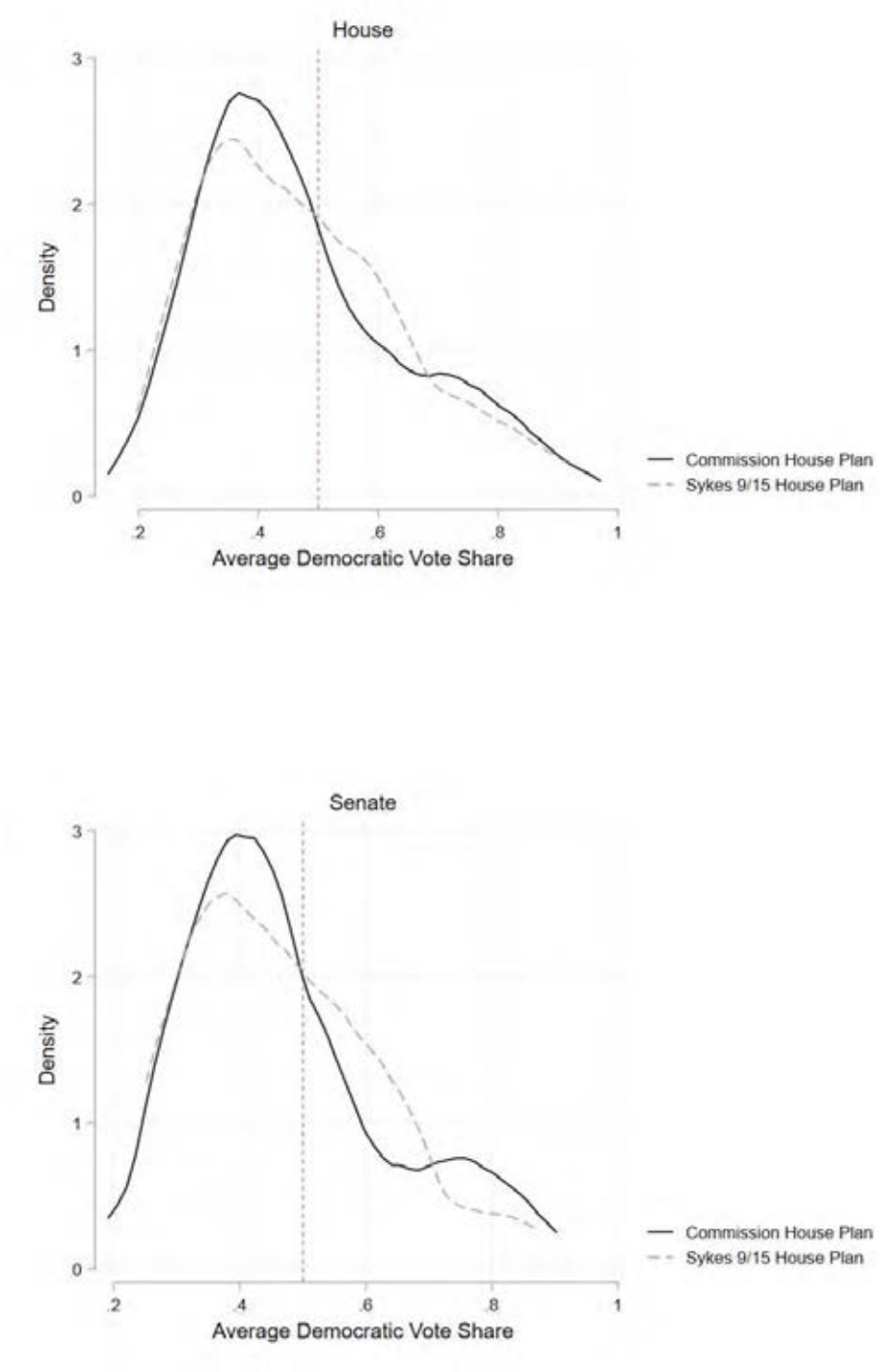
56. In order to gain a better appreciation for the way in which the maps drawn by the Commission differ from the more proportional alternative maps presented by Senator Sykes and the Citizens' Commission, and in this report, it is useful to look at how the different maps diverged in addressing the geographic distribution of partisanship across districts.

57. To do this, I present a kernel density—which is simply a smoothed histogram—that displays the distribution of the Democratic vote share across districts for each proposed redistricting plan. Figure 2 does this first for the House plans (in the top panel), and then for Senate plans (in the bottom panel). The bold line captures the distribution of Democratic vote share across the districts in the Commission's maps, and the dashed gray line captures the same thing for the Sykes 9/15 maps. The distributions for the Sykes 9/2 maps as well as the Citizens' Commission maps, as well as my own maps, look very similar to the gray dashed lines, so, for ease of exposition, I do not include them.

58. The basic shape of the kernel density in Figure 2 is one that I have written about elsewhere.[8] Democratic voters tend to be highly concentrated in the urban core of large cities, while Republican voters are concentrated in sprawling rural areas, and suburban areas are heterogeneous and competitive. Inner-ring suburban areas usually lean toward Democrats, and as one moves to the outer-ring suburbs, the Republican vote share increases. In recent years, Democratic majorities have been spilling further out into the suburbs, and in cities like Columbus, now reach to the distant outer suburbs and even some exurbs.

[8] See Jonathan Rodden, 2010 "The Geographic Distribution of Political Preferences," *Annual Review of Political Science* 13:297-340; Jonathan Rodden, 2019, *Why Cities Lose: The Deep Roots of the Urban-Rural Political Divide.* New York: Basic Books.

Figure 2: Distribution of Average Democratic Vote Shares Across Proposed Districts



59. The concentration of some Democratic voters in some very urban areas means that it is often impossible to avoid drawing electoral districts that are extremely Democratic. As a result, both the Commission's map and the alternative maps produce distributions with a long right tail. All of the districts in the right tail of the distributions in Figure 2 are in very urban areas.

60. It should also be noted that in Ohio, many rural areas are also now extremely Republican, and it can be difficult to avoid drawing rural districts that are not overwhelmingly Republican. This phenomenon is only occasionally tempered by the presence of an isolated college town like Oxford or Yellow Springs, which might, for example, turn an otherwise 80 percent Republican area into a 70 percent Republican area. While the left tail of the distribution is not quite as long as the right tail, it also includes a large number of landslide Republican districts.

61. The *overall shape* of the distribution—driven by Ohio's political geography—is similar for both the Commission's plan and the alternative plans. That is to say, both have long right tails composed of urban, Democratic districts, and both produce similar numbers of rural, highly Republican districts, as demonstrated by the fact that, on the left side of the graph, the dashed line and solid line are right on top of one another.

62. It is clear that Ohio's political geography necessitates some solidly Democratic and solidly Republican districts, but map-drawers have considerable flexibility in the middle of the distribution, and with the extent of packing of Democrats in cities. In Figure 2, we can see that the shape of the distribution of partisanship across districts in the Commission's plan is distinctive in the districts that are neither solidly Republican nor solidly Democratic. This is apparent as we move to the right on the graph and enter the territory of comfortable, but not landslide, Republican victories. The Commission's maps produce a far larger number of such districts. And then, once we cross the 50 percent threshold, there is a dramatic reversal. The Commission's maps produce far *fewer* districts with Democratic majorities. Finally, the maps are also different when we move further to the right, where the black line is above the gray dashed line, indicating that the Commission's maps produce a larger number of landslide Democratic districts—what is known in the literature as "packing."

63. How did the Commission and these alternative groups of map-drawers produce maps with such starkly different partisan outcomes, given that they were working within the constraints of the same political geography and the same rather restrictive rules? To find the answer, we must examine Ohio's cities and their surroundings. The differences between the black and gray lines in Figure 2 is driven by choices made in and around cities. In particular, the Commission's maps produced notably fewer majority-Democratic districts in the regions around Akron, Cincinnati, Cleveland, Columbus, and Dayton.

Franklin County Area

64. Consider Franklin County and its surroundings. Figure 3 displays this region, with yellow lines corresponding to the districts drawn in the 2021 Commission House map. Colors go from light blue to dark blue as the precinct-level 2020 presidential Democratic vote share increases. From Figure 3, one can see how the Commission's district boundaries correspond to partisanship.

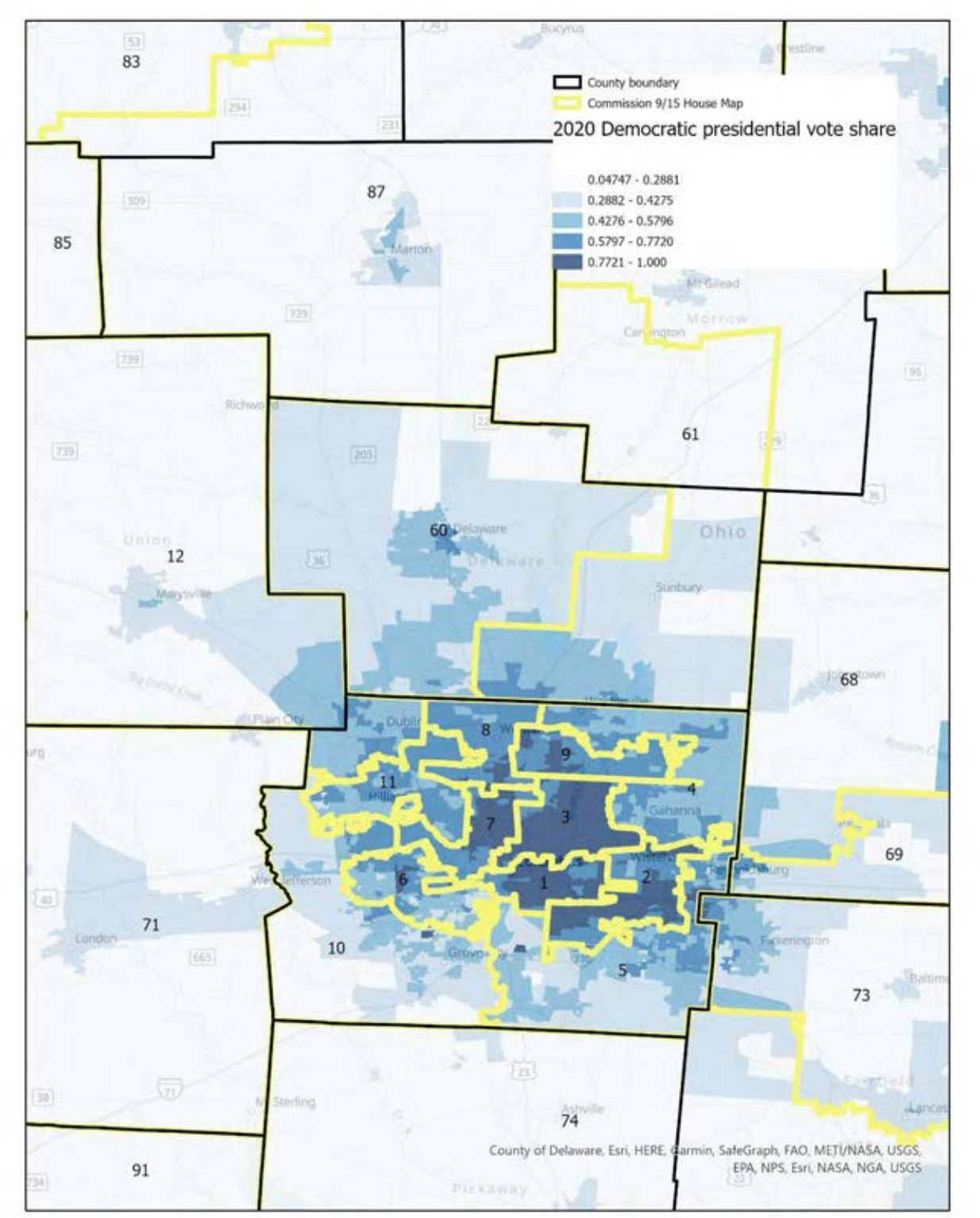
65. Several things are noteworthy about the Commission's map. First, as Franklin County has become more Democratic over time, and as Democratic dominance has spilled over from the urban core to suburban areas, there is now only one possible area for the construction of a comfortable majority-Republican district—in the southwest corner. District 10 in the

Commission's map pulls together all of the most Republican exurban parts of Franklin County in order to carve out such a district. This district runs almost the entire length of Franklin County, from the southern border almost to the northern border, stopping just short of the more Democratic-leaning suburban areas in the northwest corner of the county.

66. Second, in the northwest corner of the county, Dublin—especially the part in Franklin County closest to Ohio State University—is an educated suburban community that has been drifting toward the Democratic Party in recent years. It is one of the most Democratic border-adjacent communities in Franklin County. However, instead of connecting it with surrounding Democratic-leaning communities, the Commission map splits Franklin County in the northwest corner to extract Dublin from the rest of Franklin County, combining Dublin with relatively rural Union County. In doing so, the Commission map thus extracts a growing Democratic community and embeds it in a district with numerically greater rural Republicans. Given its population of 1,323,807, Franklin County could easily accommodate 11 districts without a split. Instead, the Commission chose to create 9 under-populated districts and extract a relatively large chunk of Democratic voters from the county, preventing those voters from contributing to an additional Democratic district.

67. Finally, there is a group of growing, increasingly Democratic-leaning Columbus suburbs hugging the southern border of Delaware County, and a corridor of Democratic-leaning precincts connecting to the relatively Democratic town of Delaware. If we use decade averages, these suburbs appear to be Republican leaning. However, they have moved sharply toward the Democratic Party in recent years, and in the 2020 Presidential Election, a majority of voters in these suburbs voted for the Democratic candidate. Using the most recent election results, these areas would easily correspond to a compact majority-Democratic district. Instead, the Commission's districts split those increasingly Democratic voters in half with a north-south dividing line, thus preventing a majority-Democratic district from emerging in that area, instead producing 2 very comfortable Republican districts. This is a classic example of what is known in the literature on gerrymandering as "cracking."

Figure 3: Franklin County and Surroundings; Partisanship and the Commission's House Boundaries



68. It is useful to contrast the Commission's plan with the alternative plans that exhibited greater statewide proportionality. Beginning with the Commission's plan, followed by my own alternative plan (referred to as the "my plan" or the "Rodden plan"), the Sykes 9/15 plan, and the Citizens' Commission plan, Figure 4 simply displays the districts with Democratic majorities in blue and Republican majorities in red, using averages over all statewide elections from 2012 to 2020. Similar maps will be presented below for other regions, where highly competitive districts, with average Democratic vote share between 48 percent and 52 percent will be displayed with separate colors, but none of the districts displayed in Figure 4 are in that range.

69. In Franklin County and the surrounding area, the Commission's plan produces 10 majority-Democratic House districts. In Figure 4, we can see that the Rodden plan, along with the Citizens' Commission plan, produces 11 majority-Democratic districts, while the Sykes plan produces 12.

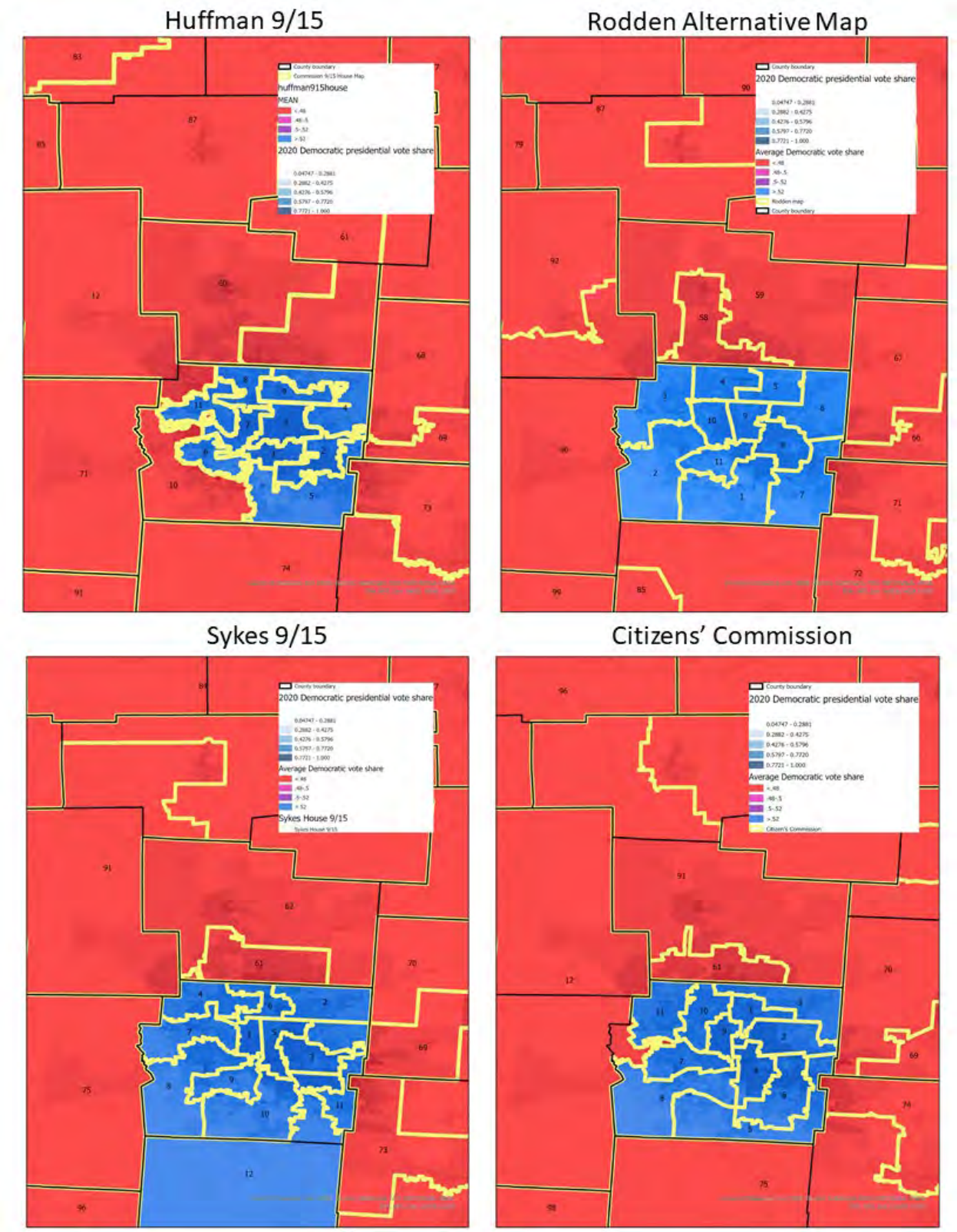
70. Let us now examine the choices made in the alternative maps that produced additional Democratic-leaning Franklin-County districts. First, those drawing alternative maps simply avoided making a special effort to carve out a Republican district in the southwest. For instance, my plan included a relatively compact district in the southwest corner of the county, but I made no effort to keep Democratic-leaning Columbus districts out in order to craft a Republican-leaning district.

71. Second, since they did not attempt to carve out a Republican district, the alternative plans engaged in less packing of Democrats into highly non-competitive districts. While the Commission's plan produced 4 Franklin-County districts where the Democratic vote share was above 75 percent, each of the alternative plans each produced only 2 such districts.

72. Third, the alternative plans took different approaches to splitting the county. As described above, my approach was to keep counties whole whenever possible. Since it was possible to avoid splitting Franklin County, I did not introduce a split. Like the Commission's plan, the Sykes plan did include a split, and it generated a district that combined some Franklin County precincts that favor Democrats with some rural Republican precincts in a surrounding county (Pickaway). But Pickaway is a smaller county than Union, such that while the Commission's split produced a comfortable Republican district in the northwest, the Sykes plan's split produced a competitive but Democratic-leaning district in the south. The Citizens' Commission did not produce systematically underpopulated districts in Franklin County and, as a result, required a much smaller split fragment of Franklin County.

73. Fourth, note that each of the alternative plans produced a compact district in southern Delaware County by keeping the growing Columbus suburbs together rather than splitting them in half. These districts are colored red in Figure 4, which is based on average vote shares over the last decade. However, if one focuses on the 2020 presidential election, these districts are majority-Democratic. Joseph Biden received around 51 percent of the vote in district 61 in both configurations.

Figure 4: Franklin County and Surroundings; Party Majorities Associated with House Boundaries of Four Redistricting Plans



74. Finally, it is worth noting that the districts in my plan are more compact than those created by the Commission. If we leave aside Delaware County and focus only on the districts of Franklin County, the average compactness of my districts, according to the Polsby-Popper score, was .39, while the score for the Commission's plan was .19. The score for the Sykes plan was .25, and that for the Citizens' plan was .30. The average Reock score for my plan was .47, while the score for the Commission's plan was .37. The scores for the Sykes and Citizens' plans were .40 and .37 respectively.

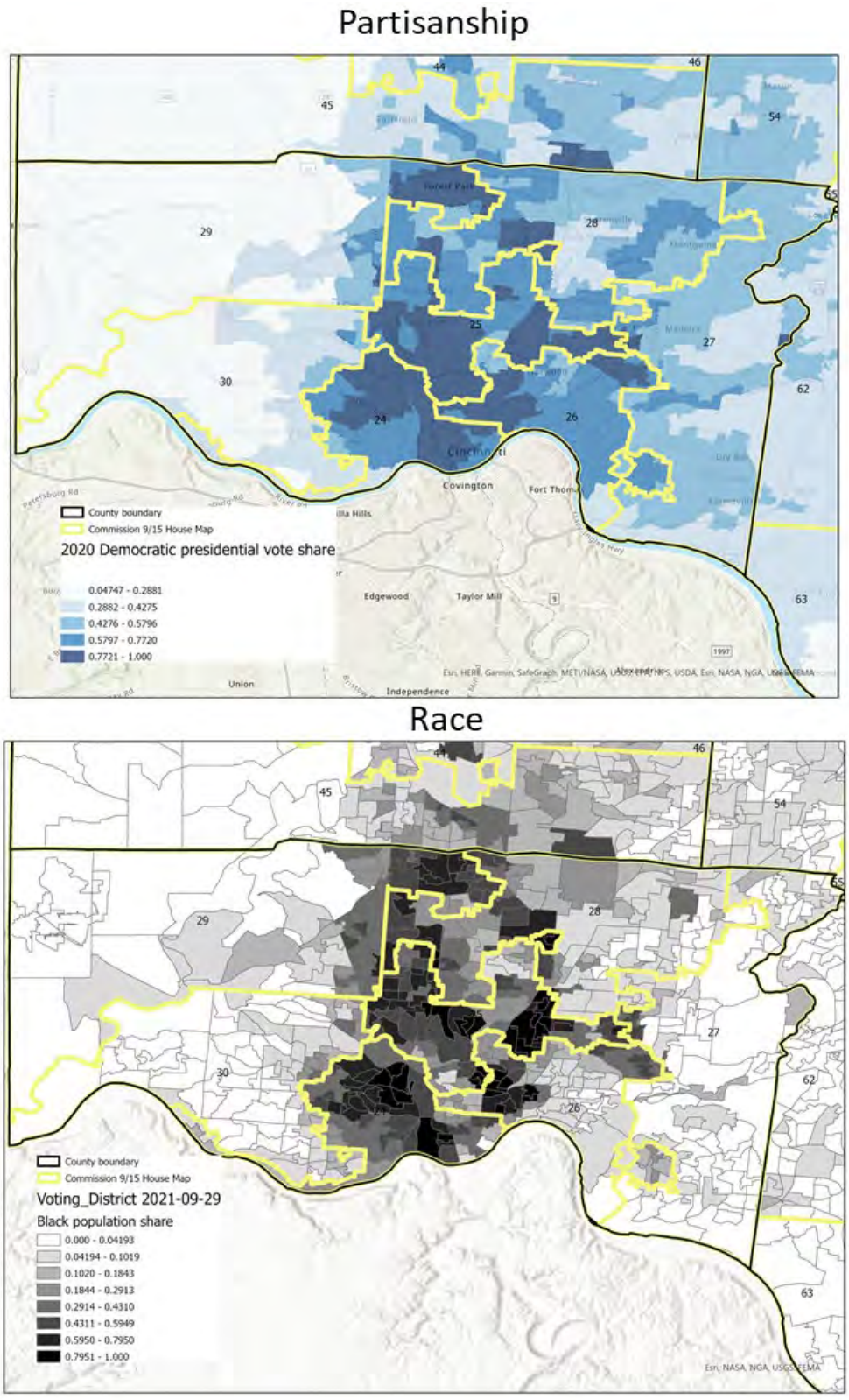
Hamilton County Area

75. Next, let us examine the Cincinnati area. Again, it is useful to get the lay of the land by viewing a precinct-level map of partisanship, superimposing the Commission's districts. It is also useful to understand the arrangement of race, which is highly correlated with voting behavior in metro Cincinnati. Figure 5 demonstrates that there is a north-south swath of Black voters in the middle of Hamilton County. These communities vote in large numbers for Democratic candidates. However, there are also Democratic-leaning suburban communities on the east side of Cincinnati that are not predominantly Black.

76. On the west side of Hamilton County, a majority-white, Republican-leaning district will emerge in the outer-ring suburbs and exurbs of Cincinnati in almost any configuration. However, the Commission has crafted a *second* majority-Republican district by keeping both districts as small as possible (within the 5 percent population deviation constraint) and reaching into Forest Park City—a majority-Black and overwhelmingly Democratic area, and surrounding precincts, in order to assemble sufficient population to produce an additional majority-Republican district. As discussed further below, this maneuver led to the creation of a relatively non-compact set of Hamilton County districts.

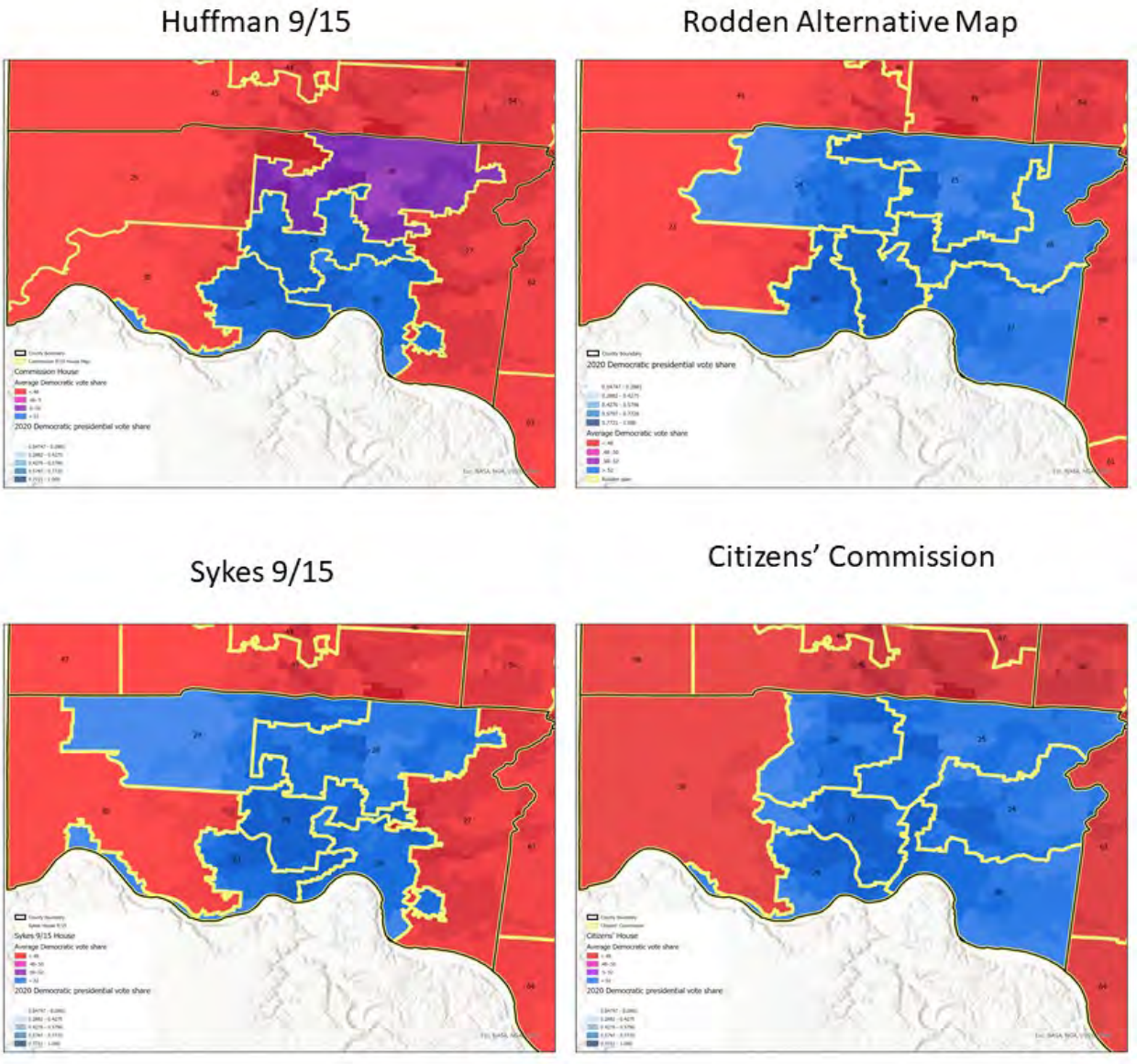
77. Moreover, by carefully avoiding Democratic neighborhoods, the Commission's plan also extracted a Republican-leaning district in Cincinnati's eastern suburbs (District 27). In addition, in the northern suburbs, District 28 in the Commission's plan, while Democratic leaning, is within reach for Republican candidates, with an average Democratic vote share of around 52 percent.

Figure 5: Hamilton County and Surroundings; Partisanship, Race, and the Commission's House Boundaries



78. Next, let us examine the alternative plans. Like the Commission's map, each of the alternative maps avoided splitting Hamilton County, which wholly contains 7 districts in each map. The Commission's map produced 3 Republican districts and 4 Democratic districts, 1 of which was relatively competitive. My plan, along with the Citizens' plan, produced a 6-1 breakdown, and the Sykes plan produced a 5-2 breakdown, both in favor of the Democrats.

Figure 6: Hamilton County and Surroundings; Party Majorities Associated with House Boundaries of Four Redistricting Plans



79. What accounts for these differences? Above all, these alternative plans made no efforts to craft a second Republican district in the suburbs by cracking Black neighborhoods in the northern part of the county, leaving them with only a single exurban Republican-leaning district. Second, by adopting an east-west rather than north-south orientation for the boundaries on the east side of the county, my plan, along with the Citizens' plan, did not craft an eastern Republican-leaning district.

80. Finally, as with Franklin County, the plans that exhibited greater statewide partisan proportionality were also the most compact in Hamilton County. My plan and the Citizens' Commission plan, both with 6-1 Democratic margins, were the most compact plans in Hamilton County. The average Polsby-Popper score for the Citizens' plan was .31, and for my plan it was .26. The Commission's plan and the Sykes plan each had scores of .17. The story is similar for the Reock score. The average for my plan was .43, and for the Citizens' plan it was .41, while for the two more Republican-leaning plans (the Commission's plan and the Sykes plan), the scores were .32 and .34 respectively.

Montgomery County Area

81. Next, let us move a few miles to the north and examine the Dayton area. In the Commission's House plan, only 1 of 5 Montgomery-based seats (number 38) has a clear Democratic majority, while an additional seat (number 36) was essentially a tie, with an average Democratic vote share of 50.03 percent. The other 3 seats had comfortable Republican majorities.

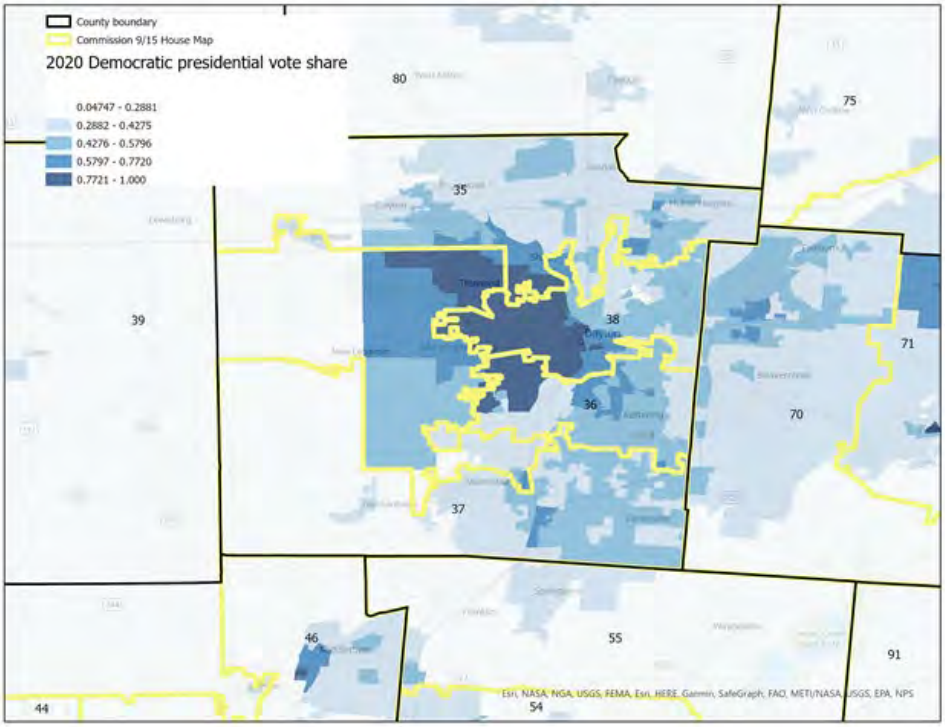
82. In my plan, there were 3 majority-Democratic seats, although 1 of them was a marginal seat, with an average Democratic vote share of 51.5 percent. Likewise, both the Sykes and Citizens' Commission plans produced 3 majority-Democratic seats. In order to see how the Commission's plan produced such a surprisingly pro-Republican outcome, let us once again examine how the Commission's districts interact with the partisan and racial geography of the county.

83. In Figure 7, the Commission's House district boundaries are superimposed on maps of partisanship and race in the Montgomery County area. The Commission's plan takes the relatively compact Black community of metropolitan Dayton, which votes overwhelmingly for Democratic candidates, and scatters it across 4 separate districts. The district with the largest Black community—number 38—is a majority-Democratic district. In fact, it is a super-majority Democratic district, where on average, Democrats win 69 percent of the vote. However, all of the other fragments of Dayton's Black community are combined with sufficient numbers of surrounding white, suburban populations in the 4 other Montgomery districts to generate 1 true toss-up (District 36) and 3 districts with comfortable Republican majorities.

84. A key part of this approach was to extract the Black community of Trotwood and other areas on the west side of Dayton and combine them with far-flung, rural Preble County to the west. Considerable care and craft seem to have gone into this effort to break up Black areas of metropolitan Dayton in a way that prevents the emergence of majority-Democratic districts.

Figure 7: Montgomery County and Surroundings; Partisanship, Race, and the Commission's House Boundaries

Partisanship



Race

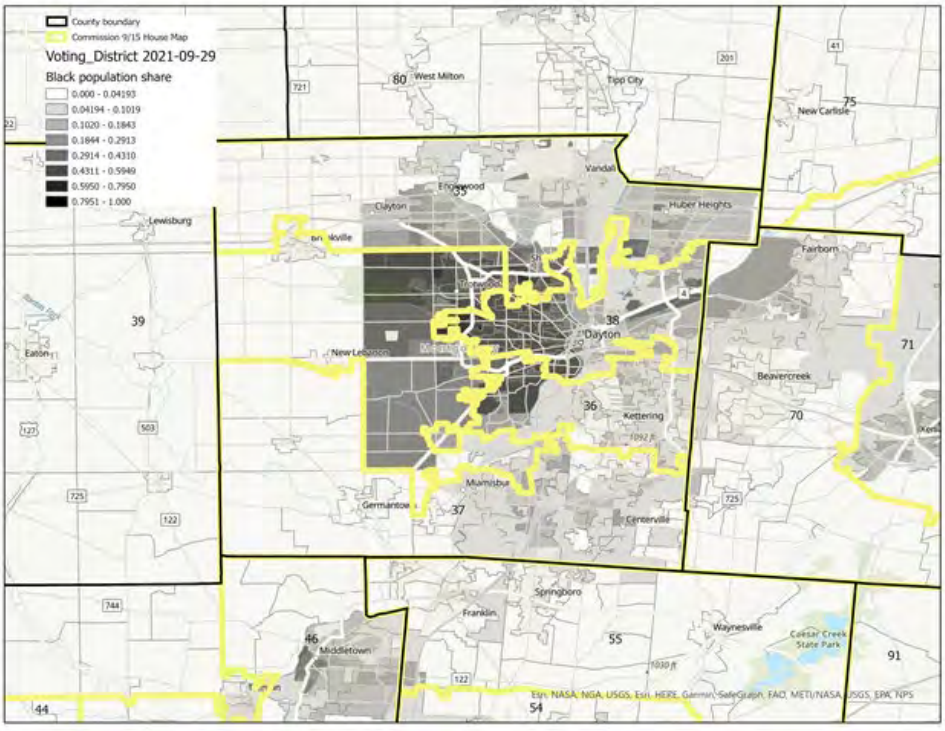
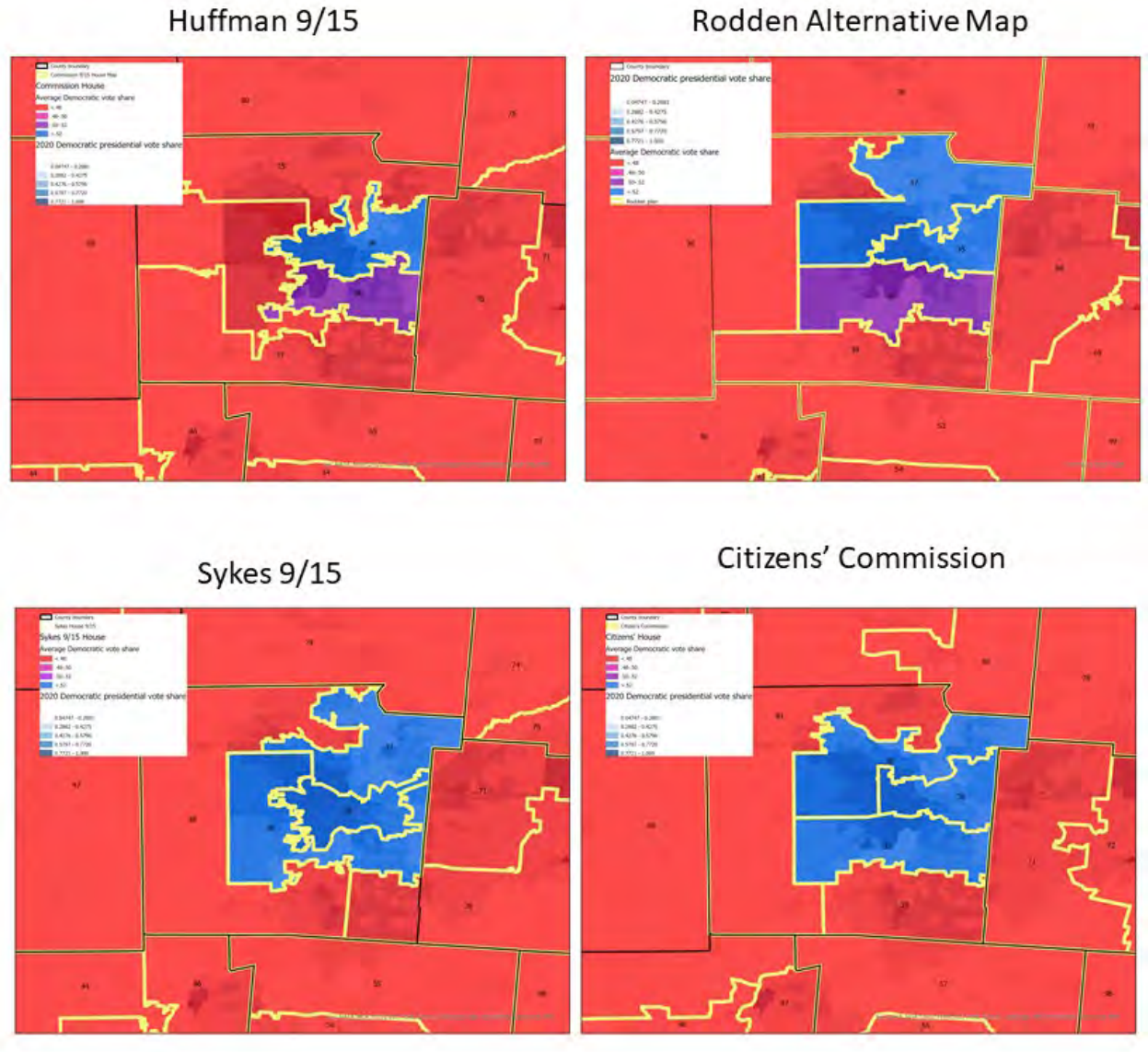


Figure 8: Montgomery County and Surroundings; Party Majorities Associated with House Boundaries of Four Redistricting Plans



85. Again, in order to appreciate the partisan impact of the Commission's approach to scattering the Dayton Black community across multiple districts, it is useful to examine the alternative maps. Following the same format as above, Figure 8 provides maps that facilitate comparison of the Commission's plan with the alternative plans.

86. Simply by keeping Dayton-area communities together, my map produced a relatively compact, very Democratic central Dayton district, as well as a Democratic-leaning northern suburban district, and a competitive but Democratic-leaning suburban district to the south. My plan also includes a Republican-leaning exurban district to the South, and a western exurban district that, like the Commission's district, combines with Preble County. A notable difference, however, is that my plan does not extract western Dayton-area Black communities in order to place them in a predominantly rural district. The configuration is different, but the same overall structure is present in the Citizens' plan. The Sykes plan has some similarities, but it is less compact, and combines parts of the Southern and western suburbs.

87. Once again, my plan and the plan produced by the Citizens' Commission, were substantially more compact according to the Polsby-Popper score, with average scores of .27 and .29 respectively for the Montgomery districts. The average score of the Commission's plan was .15, and the Sykes plan was .13. The four plans were less distinctive, however, according to the Reock score—all were bunched together with scores ranging from .37 to .39.

Northeast Ohio

88. Next, let us examine Northeast Ohio. As described above, all of the mapmakers faced difficult constraints associated with the strict rules for the construction of Senate districts, and these rules had implications for House districts as well. Each of the redistricting plans considered here ended up with the same basic solution: they drew consistently under-populated districts in Cuyahoga County, and indeed throughout the northeastern part of the state, and included a district that combines parts of several counties. Also, in each plan, it was necessary to create a district that kept Canton, Ohio whole.

89. In spite of these constraints, the Commission's plan ended up with a very different partisan outcome than the alternative plans. If we consider Northeast Ohio to be the area contained in Figure 9, the Commission's House plan includes 14 districts with average Democratic vote shares above 52 percent, and an additional 4 districts with very slim Democratic majorities, for a total of 18 majority-Democratic districts. As mentioned above, the Commission's House plan does not include any bare-majority Republican districts, in Northeast Ohio or anywhere else. Under the Commission's plan, 18 is perhaps the upper limit of districts that might be competitive for Democratic candidates.

90. In my plan, there are 17 districts with an average Democratic vote share above 52 percent, and 2 additional districts with Democratic vote shares between 50 and 52 percent, so that overall, there are 19 Democratic-leaning districts. The Sykes plan includes 17 districts with average Democratic majorities greater than 52 percent, 2 districts with slim Democratic-majorities, and 2 districts with slim Republican majorities, for a total of 19 Democratic-leaning districts, and 21 districts that could be at least competitive for Democratic candidates. The House plan produced by the Citizens' Commission produced 19 districts with average Democratic vote shares greater than 52 percent, and 2 additional districts with slim Republican majorities, again producing 21 districts that could be competitive for Democratic candidates.

91. To understand the sources of these differences, let us proceed through the region, guided by the image of the Commission's district boundaries superimposed on precinct-level election results (Figure 9), and images capturing the partisan outcomes produced by the Commission's maps and the alternative maps (Figure 10).

Figure 9: Northeast Ohio; Partisanship and the Commission's House Boundaries

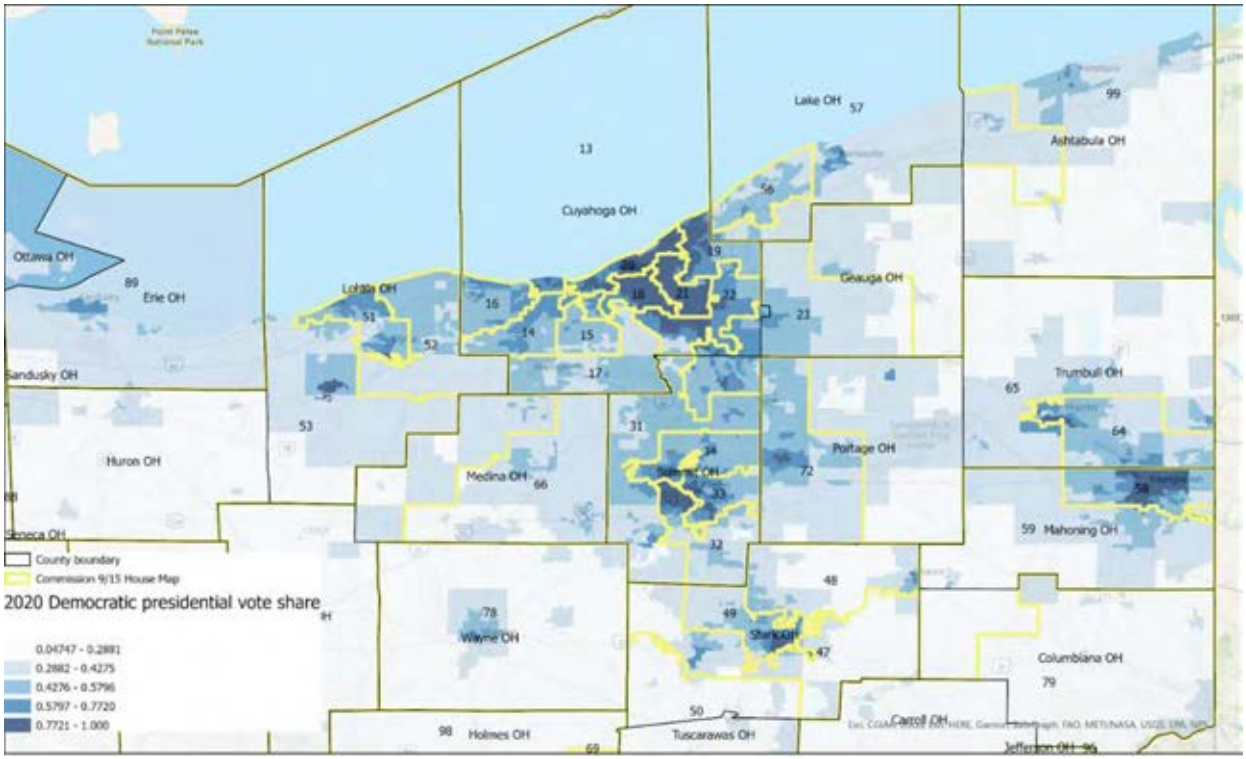


Figure 10a: Northeast Ohio; Party Majorities Associated with House Boundaries of the Commission's Plan and the Rodden Alternative Plan

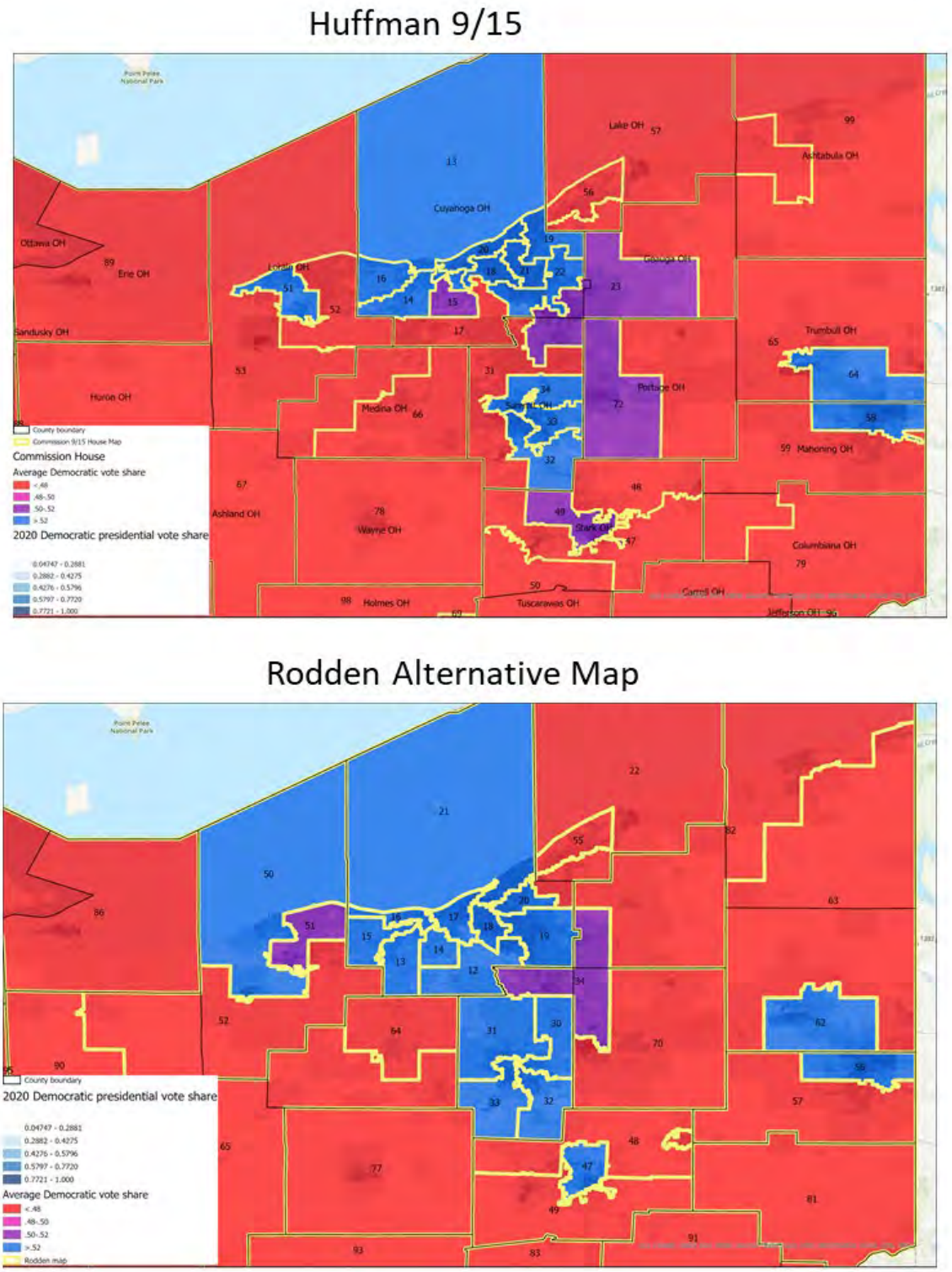
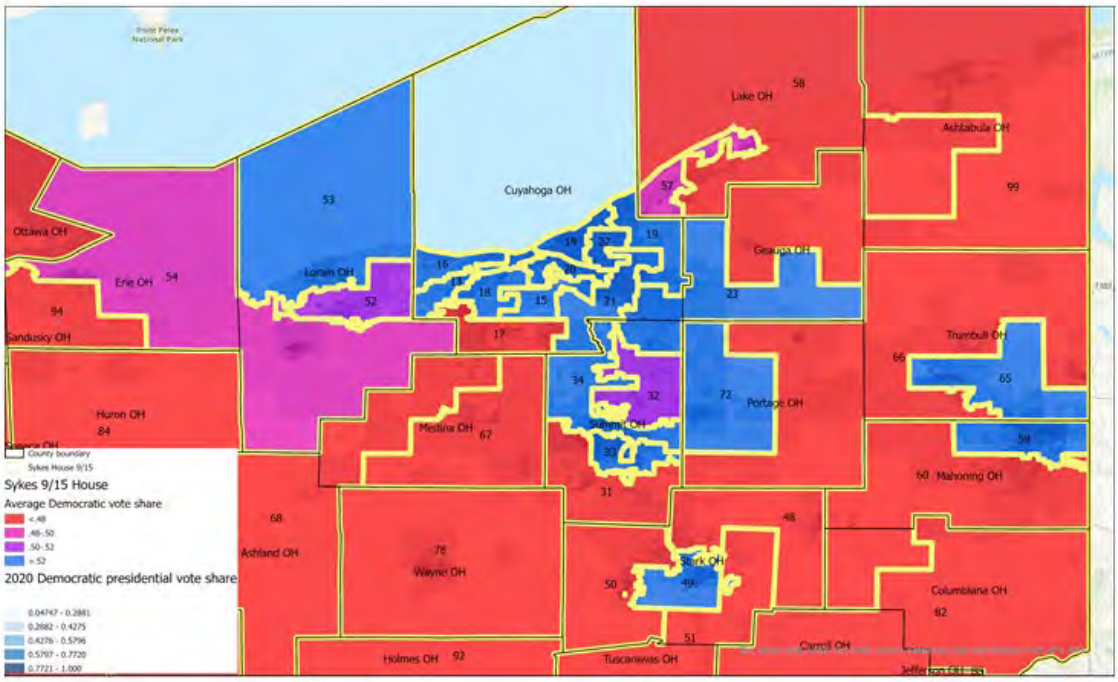
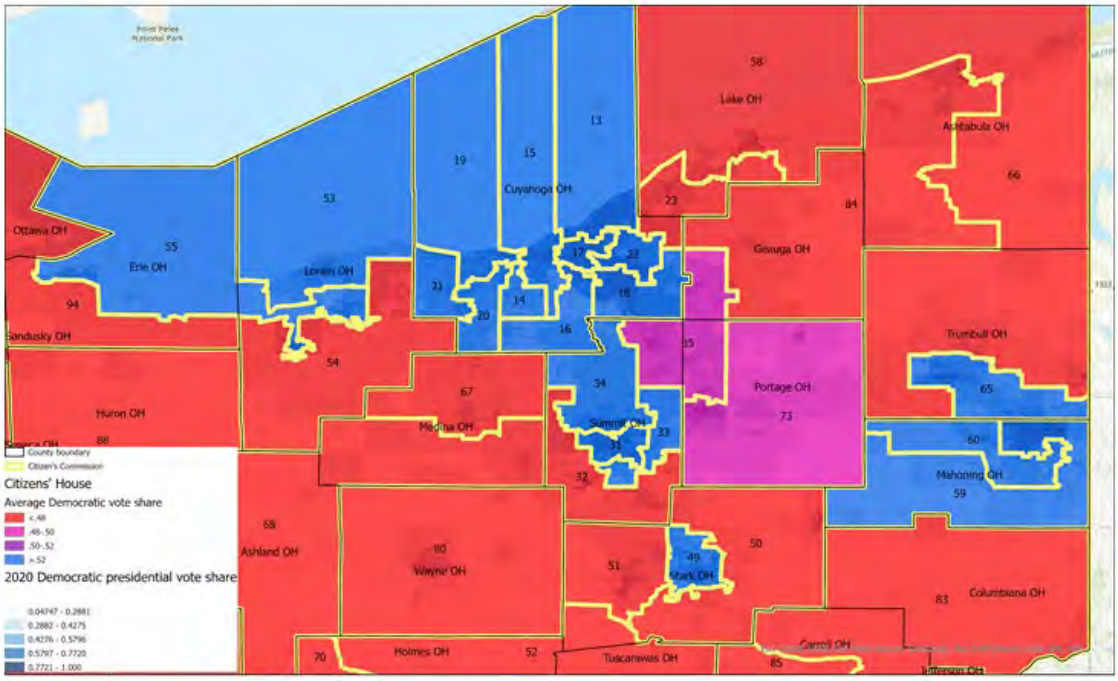


Figure 10b: Northeast Ohio; Party Majorities Associated with House Boundaries of the Sykes 9/15 and Citizens' Commission Plans

Sykes 9/15



Citizens' Commission



92. I begin with the county of Lorain. There are long-standing Democratic strongholds in each of the old industrial towns along the lake between the Sandusky Bay and Cleveland, including Lorain and Elyria, both of which are in Lorain County. Slightly to the southwest of Elyria is the small Democratic stronghold of Oberlin. Combined with their Republican suburban and rural surroundings, these towns make Erie and Lorain extremely competitive. Democrat Richard Cordray won Lorain County in the 2018 gubernatorial election by 6,578 votes, and all other statewide Democrats also won Lorain County that year, but Donald Trump won Lorain County by 3,853 votes in the 2020 presidential election. In Erie County, while Trump won by over 4,000 votes in 2020, Republican Governor DeWine received only 83 more votes than Cordray.

93. In this region, the Commission's plan produced only a single, very Democratic seat, with an average Democratic vote share of 63 percent, surrounded by comfortably Republican seats. This was achieved by combining the cities of Lorain and Elyria into a single district, numbered 51. When drawing districts in Lorain County, I avoided this packing strategy. Rather, I drew separate Lorain (50) and Elyria (51) districts. The Sykes map also created separate Lorain (53) and Elyria-based (52) districts. In both my map and the Sykes map, the Lorain-based district ends up comfortably Democratic, while the Elyria seat is Democratic-leaning but quite competitive. The Sykes approach also creates a competitive Republican-leaning district that includes Sandusky and Oberlin. In general, the Sykes plan makes this section of the Lake Erie coastline quite competitive relative to the Commission's plan. The Citizens' Commission plan produces 2 comfortably Democratic seats, by creating a Lorain-centric district, numbered 53, as well as an elongated coastal district that pulls together Elyria, Oberlin, and Sandusky.

94. Next, in Cuyahoga County, the Commission's plan carved out a comfortable Republican district along the southern border of the county, numbered 17, as well as a competitive Parma-based district, numbered 15. Looking at Figure 9, one can see that district 17 was drawn so as to pull together Republican-leaning communities in the outer suburbs. Using all of the elections since 2016, District 15 has an average Democratic vote share of 51.7 percent, but it should be noted that Donald Trump won majorities in this district in both 2016 and 2020. In addition, the district that combines Cuyahoga, Geauga, and Summit counties is essentially a toss-up, with an average Democratic vote share of 50.1 percent. In short, this plan creates 3 districts that are either comfortable or quite competitive for Republican candidates.

95. As described above, my approach to Cuyahoga County was to pay no attention to partisanship, but rather, to focus on generating a House plan that would enable a valid Senate plan. This required careful efforts to avoid splitting municipalities, while creating districts that were as close as possible to the 5 percent population deviation threshold. Those efforts did not yield a majority-Republican district in southern Cuyahoga County. The same was true of the Citizens' plan, but the Sykes 9/15 plan did produce one such district.

96. As in other metro areas examined above, an important part of the reason for the difference between the Commission's plan and the alternative plans in Cuyahoga County is that the Commission produces 6 districts with Democratic majorities higher than 70 percent, while each of the alternative plans produces only 4 such highly packed districts.

97. Next, let us turn to Summit County. The Commission's plan produces 3 comfortable Democratic districts and 1 comfortable Republican district. My plan divided most of the county into 4 relatively compact quadrants, which generated 4 Democratic-leaning districts. The Sykes plan and Citizens' Commission plans also produced 3 majority-Democratic districts and 1 majority-Republican district, but 1 of the majority-Democratic districts in the Sykes plan—number 32—is extremely competitive, with an average Democratic vote share of only 50.7 percent.

98. Next, each redistricting plan had a different approach to the city of Canton. In the Commission's plan, the Canton district, number 49, is quite competitive for Republican candidates, with an average Democratic vote share of 51 percent. In my plan, and in both the Sykes and Citizens' Commission plans, a more compact Canton-based district (numbered 47 in the Rodden plan and 49 in the others), produced more comfortable Democratic majorities (53.9 percent in the Rodden plan, 54.5 in the Sykes plan, and 54.1 percent in the Citizens' plan).

99. Finally, Mahoning County is evenly divided, with 1 majority-Democratic districts and 1 majority-Republican district in the Commission's plan, in the Rodden plan, and in the Sykes plan. The population of Mahoning County makes it possible to draw 2 House districts that fall completely within Mahoning County. My plan, as well as the Citizens' Commission plan, were able to achieve this. Note that the configuration adopted by the Citizens' Commission plan led to the creation of 2 majority-Democratic districts rather than only 1.

100. As with the other metro areas examined above, in Northeast Ohio, my alternative plan, as well as the plans introduced by Senator Sykes and the Citizens' Commission produced a larger number of majority-Democratic districts than did the Commission's plan—thus pushing the overall plan in the direction of statewide partisan proportionality. This was not achieved by abandoning the application of traditional redistricting principles. By avoiding a split of Mahoning County, my plan and the Citizens' Commission plan contained 1 fewer county split in Northeast Ohio than did the Commission's plan. There is no evidence that the specific county splits and mergers selected in the Sykes or Citizens' Commission plans did greater violence to specific communities of interest than did the Commission's plan. As in the other parts of Ohio explored above, my alternative map was more compact on average than the Commission's map. The average Polsby-Popper score for my map, as well as the Citizens' map, in the districts of Northeast Ohio was .35. The score for the Commission's plan was .30, and that for the Sykes plan was .27. The average Reock scores were closer together. The average score for my plan was .41, the Citizens' Commission and the Ohio Redistricting Commission were both .39, and Sykes plan was .37.

Summary of Case Studies

101. This tour around Ohio's metropolitan areas helps explain how the Commission managed to produce so many Republican-majority districts relative to the statewide vote share. For the most part, they followed the strategy of packing and cracking the supporters of their opponents. In each metropolitan area discussed above, the Commission generated a set of extremely Democratic districts in urban core areas, leaving fewer Democrats to contribute to potential Democratic majorities in other districts. As demonstrated by the alternative maps,

it was always possible to abide by traditional redistricting principles and draw compact districts that did not produce nearly as many extremely Democratic districts. Packing occurred not just in dense neighborhoods in large cities. Another example of packing is in Lorain County, where two Democratic cities were stuffed into the same district.

102. Second, when possible, the Commission's maps attempted to prevent geographically proximate groups of Democrats from joining together to form a district. In the Cincinnati and Dayton metro areas, for instance, this involved splitting proximate suburban Black communities and scattering them across majority-Republican districts that were largely exurban and even rural. As demonstrated by the alternative plans, these choices were not driven by constitutional rules, traditional redistricting principles, or geographic constraints. Rather, they were driven by discretionary choices.

103. Third, while keeping proximate groups of Democrats apart, when possible, the Commission's plans always attempted to string together groups of proximate Republicans to carve out majority-Republican districts within urban counties. Often, this involved a configuration based on long, narrow strips hugging the county boundary in sparsely populated exurban areas. Examples include District 10 in southwest Franklin County, District 27 in eastern Hamilton County, District 39 outside of Dayton, and District 17 in southern Cuyahoga County. District 31 in Summit County follows the Republican-leaning exurbs almost all the way around Akron.

104. Additionally, the Commission was careful in its use of county splits near cities. In Franklin County, for example, the Commission created a series of under-populated but extremely Democratic districts, freeing up voters to combine with a neighboring rural, Republican county, thus minimizing the Democratic seats produced in the Columbus area.

105. These case studies demonstrated that it is not always necessary to draw bizarre-shaped districts in order to pursue the cracking and packing maneuvers that produce surprisingly pro-Republican outcomes. However, it is telling that in each metro area my maps were, on average, more compact than those produced by the Commission according to the Polsby-Popper measure, and in most cases, according to the Reock measure as well. The same was true of the maps produced by the Citizens' Commission. Recall from Tables 2 and 3 above that when considered as a whole, my maps and those produced by the Citizens' Commission were more compact by every measure than those produced by the Ohio Redistricting Commission.

106. Overall, the contrast between the Commission's map and the alternative maps allows us to rule out the claim that the surprisingly large number of anticipated Republican seats associated with the Commission's plan were somehow driven by the confluence of Ohio's political geography, the requirements of the Ohio Constitution, and a focus on traditional redistricting principles. Indeed, we have seen that three very different alternative plans came very close to overall partisan proportionality, while abiding by the rules of the Ohio Constitution and often hewing more closely to traditional redistricting principles.

VII. CONCLUSION

107. Under no reasonable statistical method or definition do the Ohio State House of Representatives and Senate maps adopted by the Ohio Redistricting Commission achieve partisan proportionality.

108. The Commission's plan favors Republicans for reasons other than compliance with traditional redistricting principles and the Ohio Constitution's other requirements, as demonstrated by maps that I have prepared myself, as well as alternative maps presented to the Commission. These alternative maps achieve far greater partisan proportionality and are relatively similar, indeed in many cases better, according to traditional redistricting principles.

Jonathan Andrew Rodden

Jonathan Rodden

STATE OF FLORIDA COUNTY OF Duval

Sworn to before me this 22nd day of October 2021. by Jonathan Andrew Rodden

Provided Identification: Passport

Richard T Schnell

Notary Public Richard T Schnell

Notarized online using audio-video communication

RICHARD T SCHNELL
Notary Public - State of Florida
Commission # HH 29895
Expires on August 9, 2024

My commission expires 08/09/2024

How to Verify This Transaction

Every Notarize transaction is recorded and saved for a minimum of five years. Whether you receive an electronic or printed paper copy of a Notarize document, you can access details of the transaction and verify its authenticity with the information below.

To get started, visit verify.notarize.com and enter this information:

Notarize ID:	FKMSKH7S
Access PIN:	57RWAR

For more information on how to verify Notarize transactions, please visit:
support.notarize.com/notarize-for-signers/verifying-document-authenticity

Notarize

CERTIFICATE OF SERVICE

I, Derek Clinger, hereby certify that a copy of Evidence of Bennett Relators (Expert Affidavit of Dr. Jonathan Rodden) was served via email this 22nd day of October, 2021, upon the counsel listed below:

DAVE YOST
OHIO ATTORNEY GENERAL
Bridget C. Coontz (0072919)
Julie M. Pfeiffer (0069762)
30 E. Broad Street
Columbus, OH 43215
Tel: (614) 466-2872
Fax: (614) 728-7592
bridget.coontz@ohioago.gov julie.pfeiffer@ohioago.gov

Counsel for Respondents
Governor Mike DeWine,
Secretary of State Frank LaRose, and
Auditor Keith Faber

W. Stuart Dornette (0002955)
Beth A. Bryan (0082076)
Philip D. Williamson (0097174)
TAFT STETTINIUS & HOLLISTER LLP
425 Walnut St., Suite 1800
Cincinnati, Ohio 45202-3957
T: (513) 381-2838
dornette@taftlaw.com
bryan@taftlaw.com
pwilliamson@taftlaw.com

Phillip J. Strach (PHV 25444-2021)
Thomas A. Farr (PHV 25461-2021)
John E. Branch, III (PHV 25460-2021)
Alyssa M. Riggins (PHV 25441-2021)
NELSON MULLINS RILEY & SCARBOROUGH LLP
4140 Parklake Ave., Suite 200
Raleigh, North Carolina 27612
phil.strach@nelsonmullins.com
tom.farr@nelsonmullins.com
john.branch@nelsonmullins.com
alyssa.riggins@nelsonmullins.com
T: (919) 329-3812

Counsel for Respondents
Senate President Matt Huffman and
House Speaker Robert Cupp

John Gilligan (Ohio Bar No. 0024542)
Diane Menashe (Ohio Bar No. 0070305)
ICE MILLER LLP
250 West Street, Suite 700
Columbus, Ohio 43215
John.Gilligan@icemiller.com Diane.Menashe@icemiller.com

Counsel for Respondents
Senator Vernon Sykes and
House Minority Leader Emilia Sykes

Erik J. Clark (Ohio Bar No. 0078732)
Ashley Merino (Ohio Bar No. 0096853)
ORGAN LAW LLP
1330 Dublin Road
Columbus, Ohio 43215
T: (614) 481-0900
F: (614) 481-0904
ejclark@organlegal.com
amerino@organlegal.com

Counsel for Respondent
Ohio Redistricting Commission

Dated: October 22, 2021

/s/ Derek S. Clinger
Derek S. Clinger (0092075)
MCTIGUE & COLOMBO LLC
545 East Town Street
Columbus, OH 43215
dclinger@electionlawgroup.com
T: (614) 263-7000
F: (614) 368-6961

Counsel for Relators
Bria Bennett et al.

AFFIDAVIT OF DR. JONATHAN RODDEN – APPENDIX OF EXHIBITS

Index of Documents

ITEM	DESCRIPTION	BATES RANGE
A	2021 Commission Plan	RODDEN_0001 – 0003
B	2011 Adopted Plan	RODDEN_0004 – 0006
C	September 2, 2021 Ohio Senate Democratic Update	RODDEN_0007 – 0009
D	September 9, 2021 Ohio Senate President	RODDEN_0010 – 0012
E	Ohio Citizens' Redistricting Commission Plan	RODDEN_0013 – 0015
F	Article XI, Sec 8(C)(2) Statement	RODDEN_0016 – 0018
G	Curriculum Vitae of Dr. Jonathan Rodden	RODDEN_0019 – 0027
H	September 15, 2021 House& Senate Dem Caucus	RODDEN_0028 – 0030
I	Rodden Alternative Plan	RODDEN_0031 – 0033

Exhibit A

RODDEN_0002


11
2
18
23
21
24
27
32
1
13
28
26
22
29
33
12
19
31
16
3
25
15
30
5
6
20
10
4
7
17
8
9
14
©2021 CAL

RODDEN_0003

Exhibit B

Frank LaRose
Ohio Secretary of State

Ohio House Districts 2012-2022

(As Adopted 2012)

For the most up-to-date and detailed information on each district, please contact the local county board of elections.

Last Revised 02/2018

RODDEN_0005

Frank LaRose
Ohio Secretary of State

Ohio Senate Districts 2012-2022

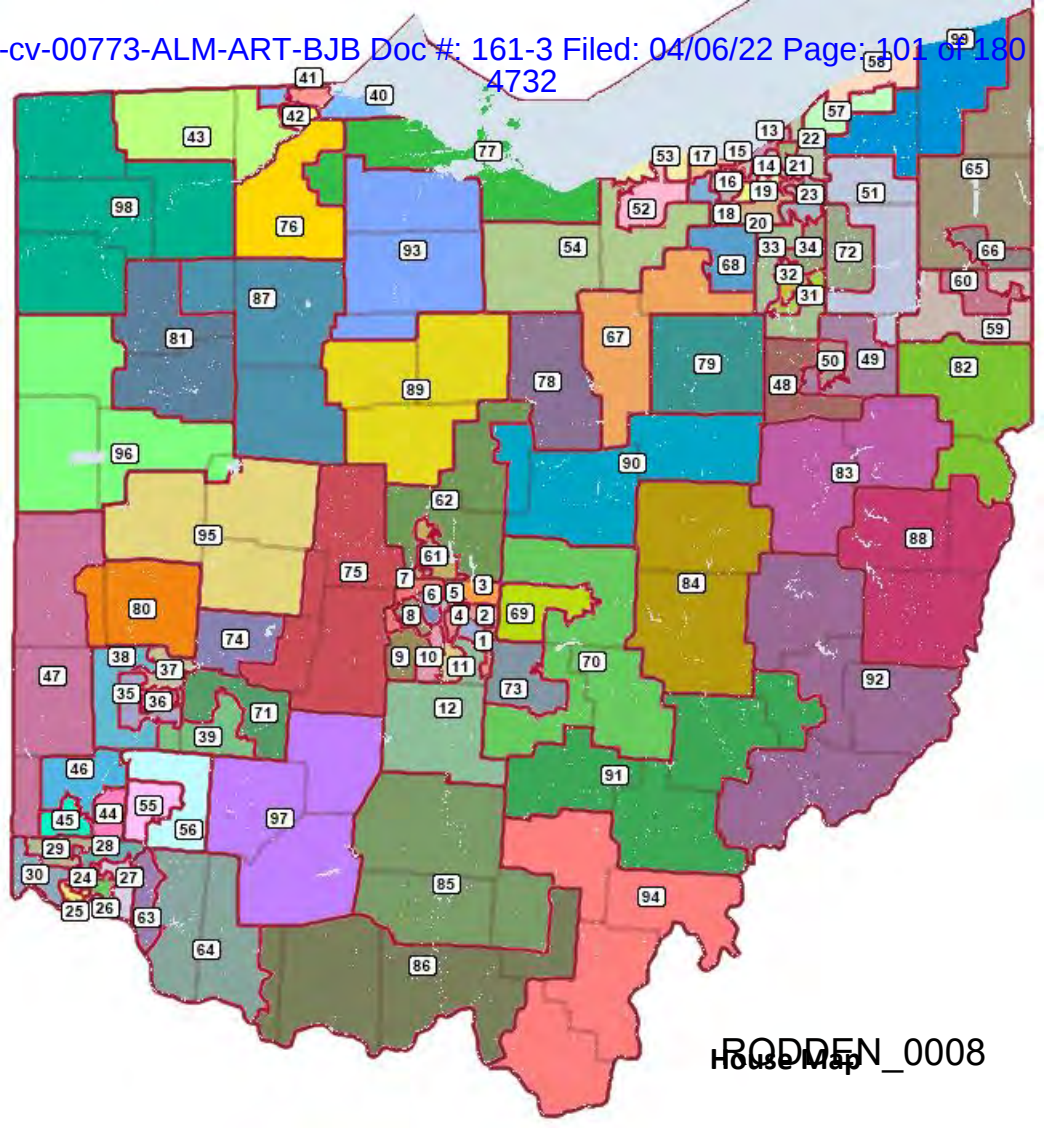
(As Adopted 2012)

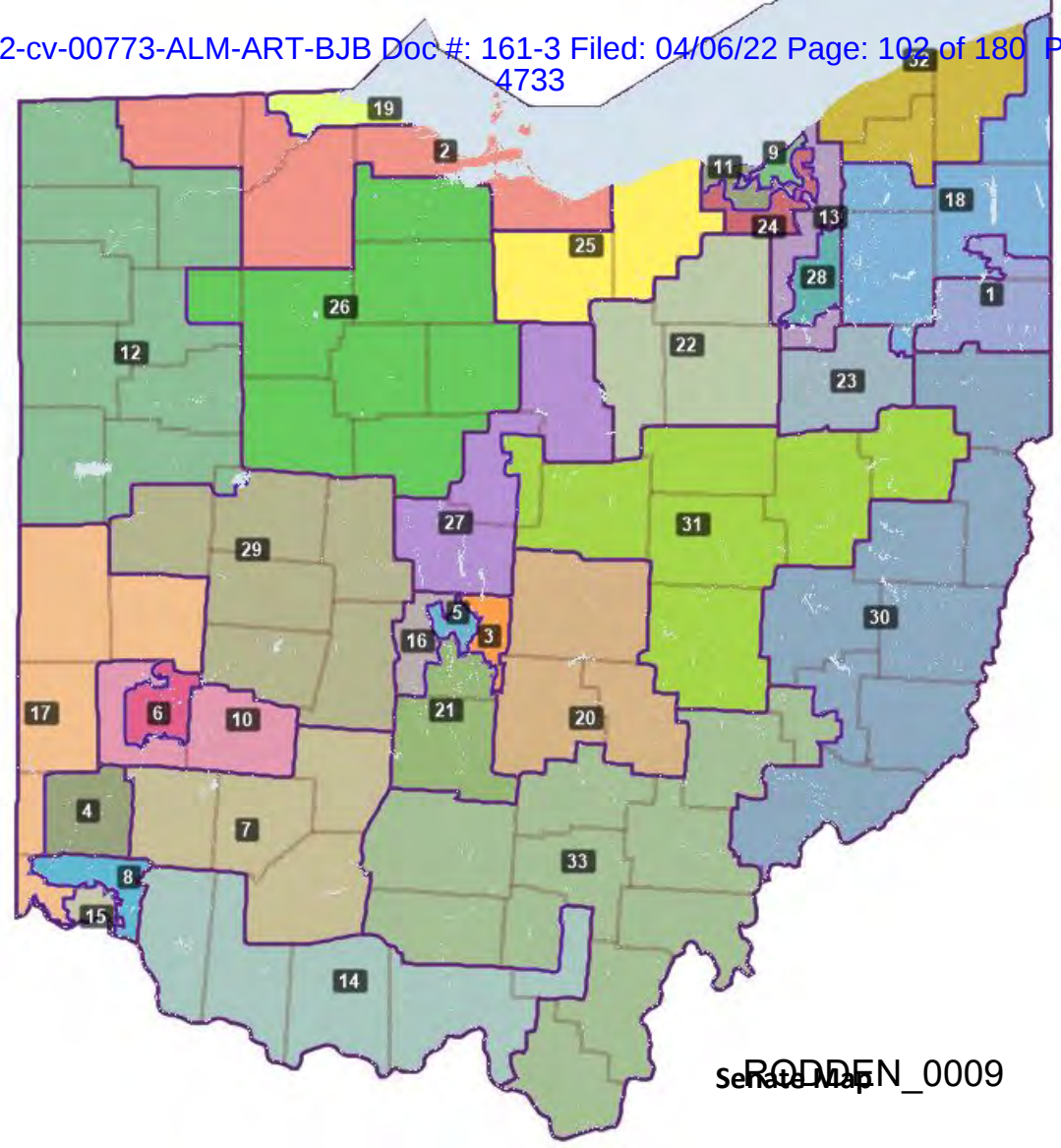
For the most up-to-date and detailed information on each district, please contact the local county board of elections.

Last Revised 02/2018

RODDEN_0006

Exhibit C


House Map


19
2
32
11
9
18
24
13
25
28
1
26
12
22
23
27
31
29
5
3
16
30
17
6
10
21
20
4
7
33
8
15
14

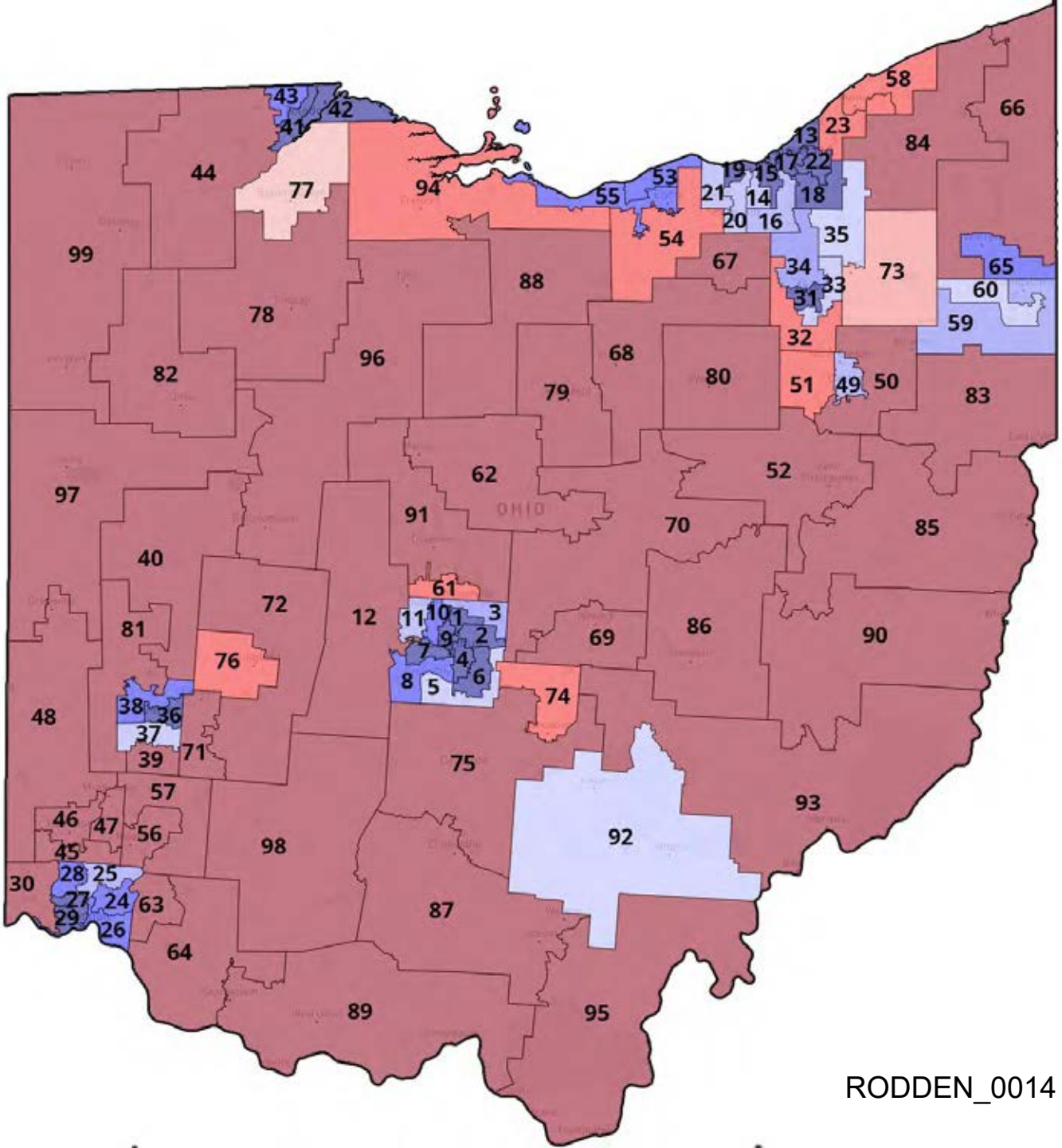
Senate Map

Exhibit D

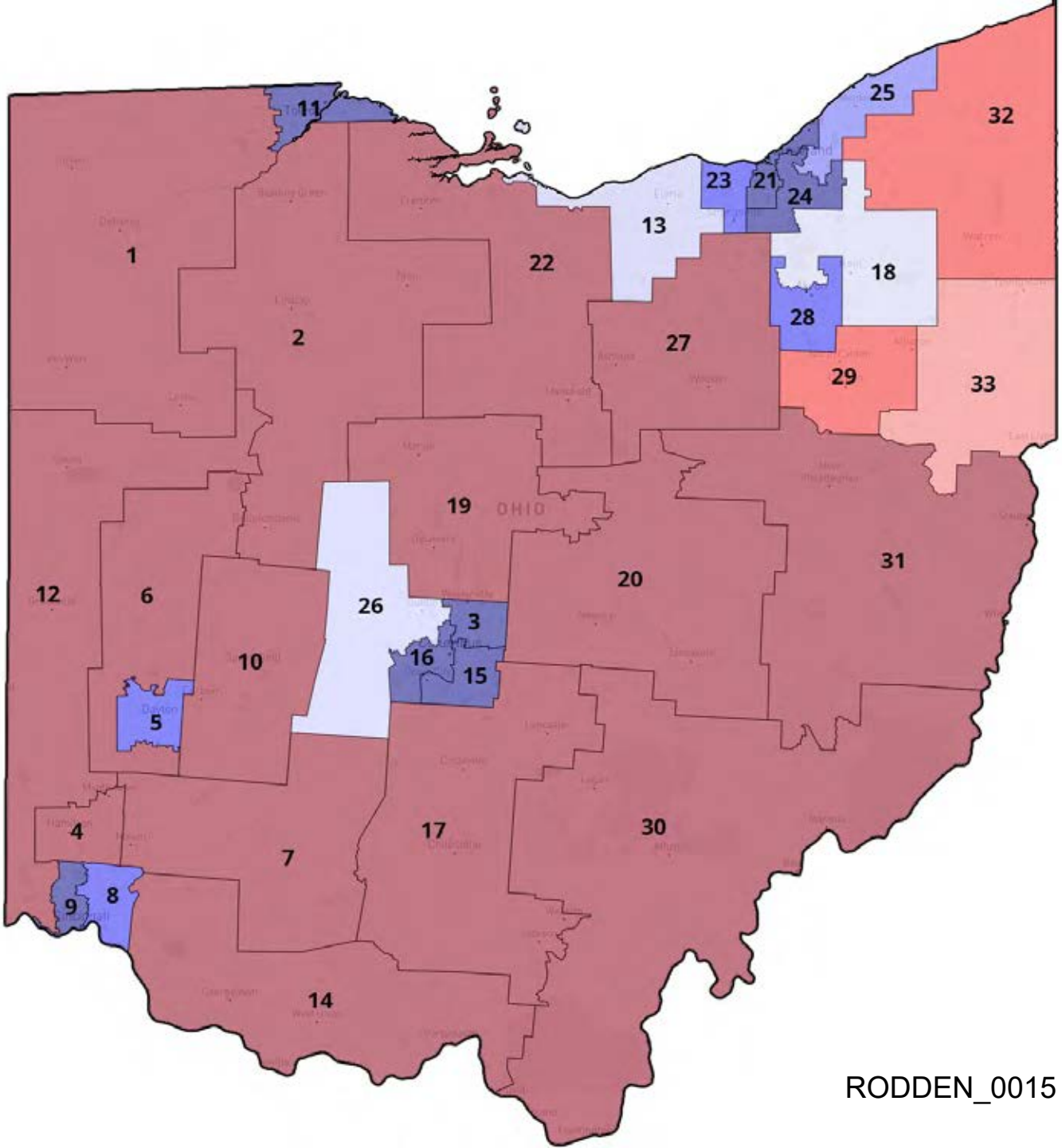

RODDEN_0011

RODDEN_0012

Exhibit E


OHIO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99

RODDEN_0014


11
25
32
23
21
24
13
1
22
18
28
2
27
29
33
19
OHIO
31
12
6
26
3
20
10
16
15
5
4
17
30
7
9
8
14

RODDEN_0015

Exhibit F

Article XI, Section 8(C)(2) Statement

Pursuant to Article XI, Section 8(C)(2) of the Ohio Constitution, the Ohio Redistricting Commission issues the following statement:

The Commission determined that the statewide preferences of the voters of Ohio predominately favor Republican candidates.

The Commission considered statewide state and federal partisan general election results during the last ten years. There were sixteen such contests. When considering the results of each of those elections, the Commission determined that Republican candidates won thirteen out of sixteen of those elections resulting in a statewide proportion of voters favoring statewide Republican candidates of 81% and a statewide proportion of voters favoring statewide Democratic candidates of 19%. When considering the number of votes cast in each of those elections for Republican and Democratic candidates, the statewide proportion of voters favoring statewide Republican candidates is 54% and the statewide proportion of voters favoring statewide Democratic candidates is 46%. Thus, the statewide proportion of voters favoring statewide Republican candidates is between 54% and 81% and the statewide proportion of voters favoring statewide Democratic candidates is between 19% and 46%. The Commission obtained publicly available geographic data for statewide partisan elections in 2016, 2018, and 2020. Publicly available geographic data for those elections was not available for elections in 2012 and 2014. Using this data, the Commission adopted the final general assembly district plan, which contains 85 districts (64.4%) favoring Republican candidates and 47 districts (35.6%) favoring Democratic candidates out of a total of 132 districts. Accordingly, the statewide proportion of districts whose voters favor each political party corresponds closely to the statewide preferences of the voters of Ohio.

The final general assembly district plan adopted by the Commission complies with all of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution. The Commission's attempt to meet the aspirational standards of Article XI, Section 6 of the Ohio Constitution did not result in any violation of the mandatory requirements of Article XI, Sections 2, 3 ,4, 5, and 7 of the Ohio Constitution.

Exhibit G

Jonathan Rodden

Stanford University
Department of Political Science
Encina Hall Central
616 Serra Street
Stanford, CA 94305

Phone: (650) 723-5219
Email: jrodden@stanford.edu
Homepage: http://www.jonathanrodden.com

Personal

Born on August 18. 1971, St. Louis, MO.

United States Citizen.

Education

Ph.D. Political Science, Yale University, 2000.

Fulbright Scholar, University of Leipzig, Germany, 1993–1994.

B.A., Political Science, University of Michigan, 1993.

Academic Positions

Professor, Department of Political Science, Stanford University, 2012–present.

Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

Associate Professor, Department of Political Science, Stanford University, 2007–2012.

Fellow, Center for Advanced Study in the Behavioral Sciences, Palo Alto, CA, 2006–2007.

Ford Career Development Associate Professor of Political Science, MIT, 2003–2006.

Visiting Scholar, Center for Basic Research in the Social Sciences, Harvard University, 2004.

Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

Publications

Books

Why Cities Lose: The Deep Roots of the Urban-Rural Divide. Basic Books, 2019.

Decentralized Governance and Accountability: Academic Research and the Future of Donor Programming. Co-edited with Erik Wibbels, Cambridge University Press, 2019.

Hamilton's Paradox: The Promise and Peril of Fiscal Federalism, Cambridge University Press, 2006. Winner, Gregory Luebbert Award for Best Book in Comparative Politics, 2007; Martha Derthick Award for lasting contribution to the study of federalism, 2021.

Fiscal Decentralization and the Challenge of Hard Budget Constraints, MIT Press, 2003. Co-edited with Gunnar Eskeland and Jennie Litvack.

Peer Reviewed Journal Articles

Who Registers? Village Networks, Household Dynamics, and Voter Registration in Rural Uganda, 2021, *Comparative Political Studies* forthcoming (with Romain Ferrali, Guy Grossman, and Melina Platas).

Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering, 2021, *Political Analysis* forthcoming (with Daryl DeFord Nick Eubank).

Who is my Neighbor? The Spatial Efficiency of Partisanship, 2020, *Statistics and Public Policy* 7(1):87-100 (with Nick Eubank).

Handgun Ownership and Suicide in California, 2020, *New England Journal of Medicine* 382:2220-2229 (with David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller).

Viral Voting: Social Networks and Political Participation, 2020, *Quarterly Journal of Political Science* (with Nick Eubank, Guy Grossman, and Melina Platas).

It Takes a Village: Peer Effects and Externalities in Technology Adoption, 2020, *American Journal of Political Science* (with Romain Ferrali, Guy Grossman, and Melina Platas). Winner, 2020 Best Conference Paper Award, American Political Science Association Network Section.

Assembly of the LongSHOT Cohort: Public Record Linkage on a Grand Scale, 2019, *Injury Prevention* (with Yifan Zhang, Erin Holsinger, Lea Prince, Sonja Swanson, Matthew Miller, Garen Wintemute, and David Studdert).

Crowdsourcing Accountability: ICT for Service Delivery, 2018, *World Development* 112: 74-87 (with Guy Grossman and Melina Platas).

Geography, Uncertainty, and Polarization, 2018, *Political Science Research and Methods* doi:10.1017/psrm.2018.12 (with Nolan McCarty, Boris Shor, Chris Tausanovitch, and Chris Warshaw).

Handgun Acquisitions in California after Two Mass Shootings, 2017, *Annals of Internal Medicine* 166(10):698-706. (with David Studdert, Yifan Zhang, Rob Hyndman, and Garen Wintemute).

Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders, 2015, *Election Law Journal* 14,4:1-15 (with Jowei Chen).

The Achilles Heel of Plurality Systems: Geography and Representation in Multi-Party Democracies, 2015, *American Journal of Political Science* 59,4: 789-805 (with Ernesto Calvo). Winner, Michael Wallerstein Award for best paper in political economy, American Political Science Association.

Why has U.S. Policy Uncertainty Risen Since 1960?, 2014, *American Economic Review: Papers and Proceedings* May 2014 (with Nicholas Bloom, Brandice Canes-Wrone, Scott Baker, and Steven Davis).

Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, 2013, *Quarterly Journal of Political Science* 8: 239-269 (with Jowei Chen).

How Should We Measure District-Level Public Opinion on Individual Issues?, 2012, *Journal of Politics* 74, 1: 203-219 (with Chris Warshaw).

Representation and Redistribution in Federations, 2011, *Proceedings of the National Academy of Sciences* 108, 21:8601-8604 (with Tiberiu Dragu).

Dual Accountability and the Nationalization of Party Competition: Evidence from Four Federatons, 2011, *Party Politics* 17, 5: 629-653 (with Erik Wibbels).

The Geographic Distribution of Political Preferences, 2010, *Annual Review of Political Science* 13: 297–340.

Fiscal Decentralization and the Business Cycle: An Empirical Study of Seven Federations, 2009, *Economics and Politics* 22,1: 37–67 (with Erik Wibbels).

Getting into the Game: Legislative Bargaining, Distributive Politics, and EU Enlargement, 2009, *Public Finance and Management* 9, 4 (with Deniz Aksoy).

The Strength of Issues: Using Multiple Measures to Gauge Preference Stability, Ideological Constraint, and Issue Voting, 2008. *American Political Science Review* 102, 2: 215–232 (with Stephen Ansolabehere and James Snyder).

Does Religion Distract the Poor? Income and Issue Voting Around the World, 2008, *Comparative Political Studies* 41, 4: 437–476 (with Ana Lorena De La O).

Purple America, 2006, *Journal of Economic Perspectives* 20,2 (Spring): 97–118 (with Stephen Ansolabehere and James Snyder).

Economic Geography and Economic Voting: Evidence from the U.S. States, 2006, *British Journal of Political Science* 36, 3: 527–47 (with Michael Ebeid).

Distributive Politics in a Federation: Electoral Strategies, Legislative Bargaining, and Government Coalitions, 2004, *Dados* 47, 3 (with Marta Arretche, in Portuguese).

Comparative Federalism and Decentralization: On Meaning and Measurement, 2004, *Comparative Politics* 36, 4: 481-500. (Portuguese version, 2005, in *Revista de Sociologia e Politica* 25).

Reviving Leviathan: Fiscal Federalism and the Growth of Government, 2003, *International Organization* 57 (Fall), 695–729.

Beyond the Fiction of Federalism: Macroeconomic Management in Multi-tiered Systems, 2003, *World Politics* 54, 4 (July): 494–531 (with Erik Wibbels).

The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World, 2002, *American Journal of Political Science* 46(3): 670–687.

Strength in Numbers: Representation and Redistribution in the European Union, 2002, *European Union Politics* 3, 2: 151–175.

Does Federalism Preserve Markets? *Virginia Law Review* 83, 7 (with Susan Rose-Ackerman). Spanish version, 1999, in *Quorum* 68.

Working Papers

Elections, Political Polarization, and Economic Uncertainty, NBER Working Paper 27961 (with Scott Baker, Aniket Baksy, Nicholas Bloom, and Steven Davis).

Federalism and Inter-regional Redistribution, Working Paper 2009/3, Institut d'Economia de Barcelona.

Representation and Regional Redistribution in Federations, Working Paper 2010/16, Institut d'Economia de Barcelona (with Tiberiu Dragu).

Chapters in Books

Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), in *Political Geometry*, edited by Moon Duchin and Olivia Walch, forthcoming 2021, Springer.

Keeping Your Enemies Close: Electoral Rules and Partisan Polarization, in *The New Politics of Insecurity*, edited by Frances Rosenbluth and Margaret Weir, forthcoming 2021, Cambridge University Press.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

The Political Economy of Federalism, 2006, in Barry Weingast and Donald Wittman, eds., *Oxford Handbook of Political Economy*, Oxford University Press.

Fiscal Discipline in Federations: Germany and the EMU, 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Online Interactive Visualization

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

Other Publications

Supporting Advanced Manufacturing in Alabama, Report to the Alabama Innovation Commission, Hoover Institution, 2021.

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

On the Migration of Fiscal Sovereignty, 2004, *PS: Political Science and Politics* July, 2004: 427–431.

Decentralization and the Challenge of Hard Budget Constraints, *PREM Note* 41, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies 32,7: 897-900.*

Fellowships, Honors, and Grants

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy

Introduction to Comparative Politics

Introduction to Political Science

Political Science Scope and Methods

Institutional Economics

Spatial Approaches to Social Science

Graduate

Political Economy

Political Economy of Institutions

Federalism and Fiscal Decentralization

Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Curcuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

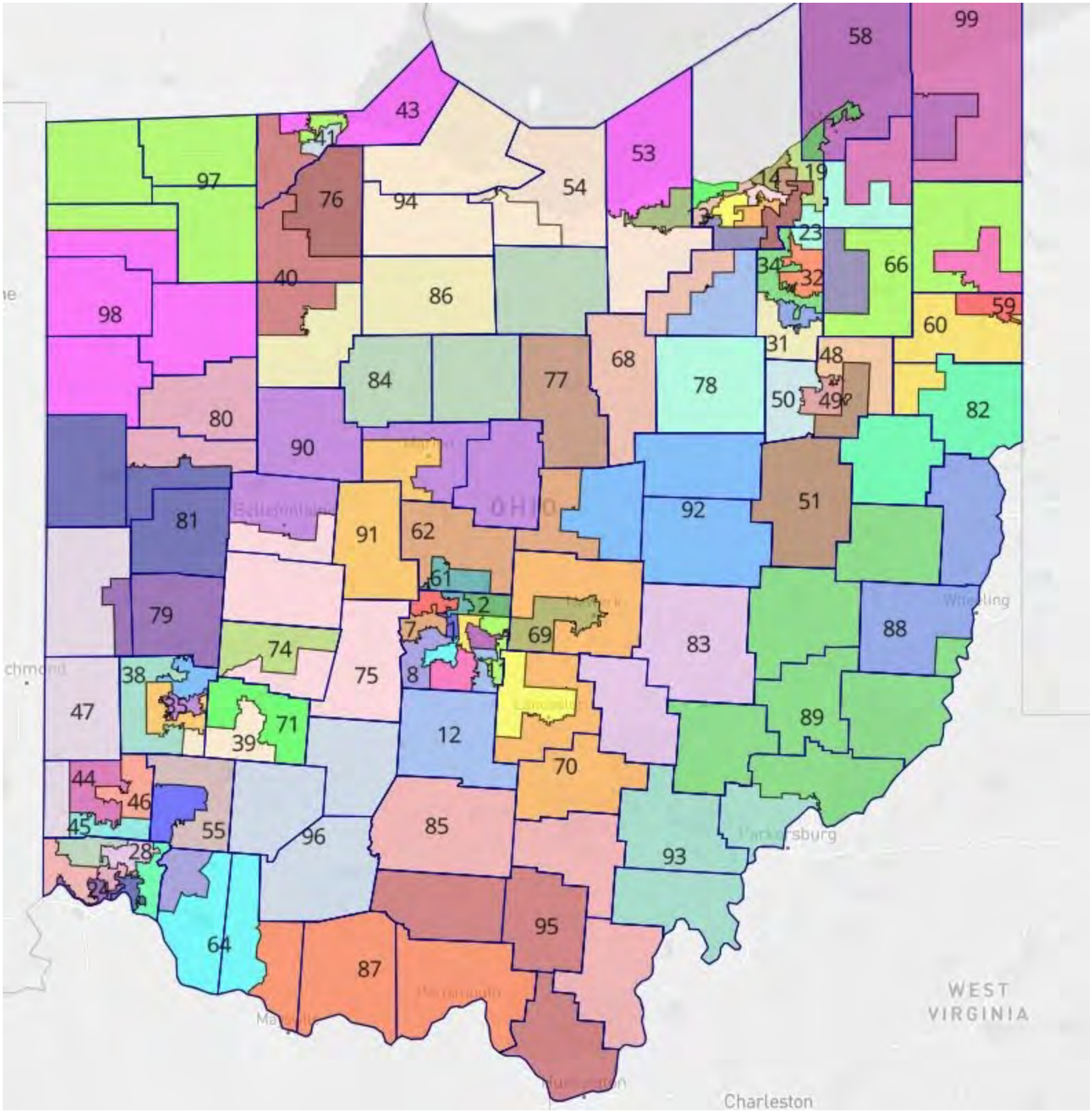
2006–2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008–2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998–2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: September 23, 2021

Exhibit H


58
99
43
41
53
97
76
94
54
14
19
23
34
32
66
40
86
59
98
60
31
48
68
84
77
78
50
49
82
80
90
OHIO
81
91
62
92
51
61
2
79
7
69
83
88
74
75
8
38
47
71
39
12
89
70
44
46
45
55
96
85
93
28
64
87
95
WEST
VIRGINIA
Charleston

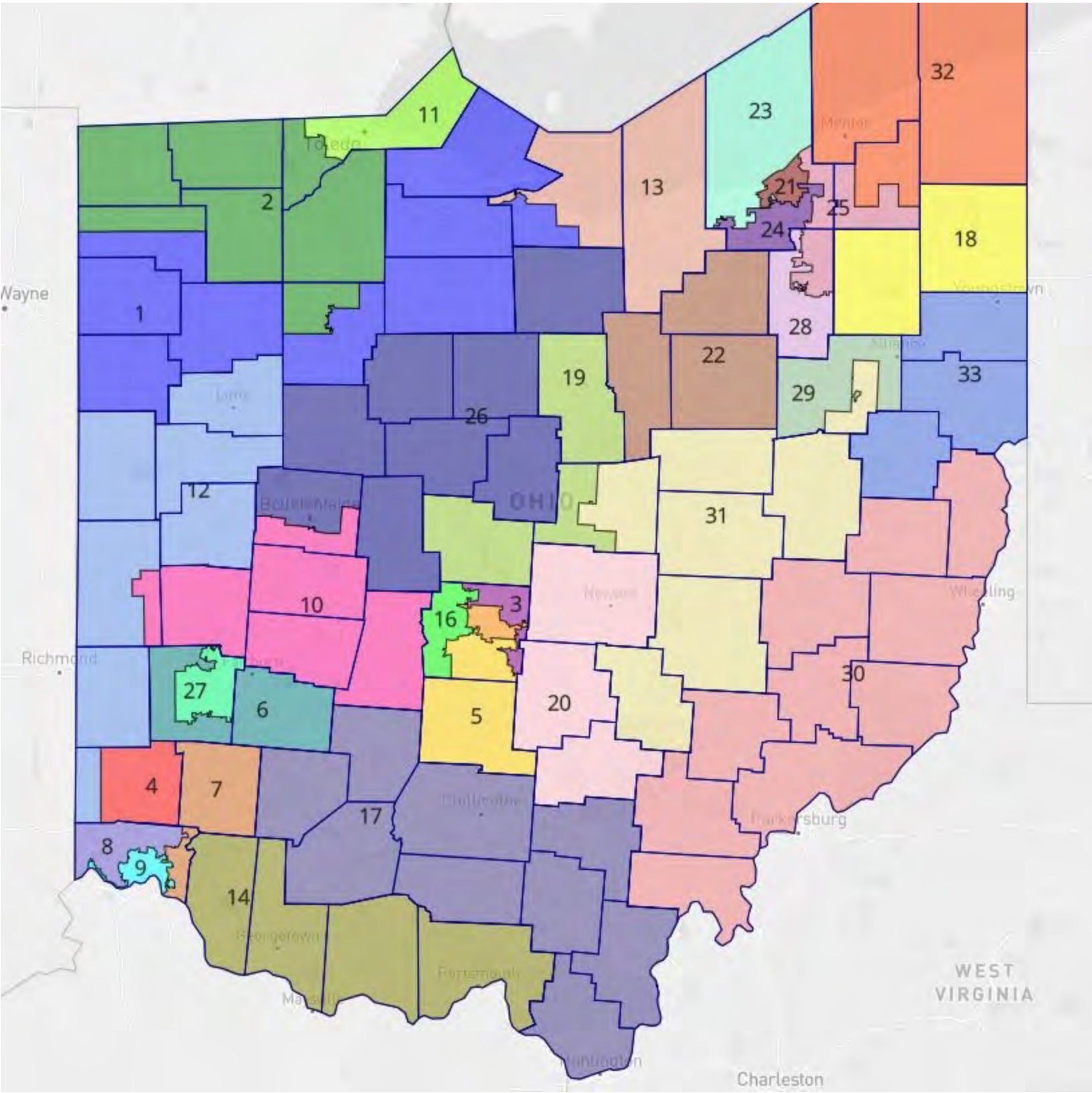
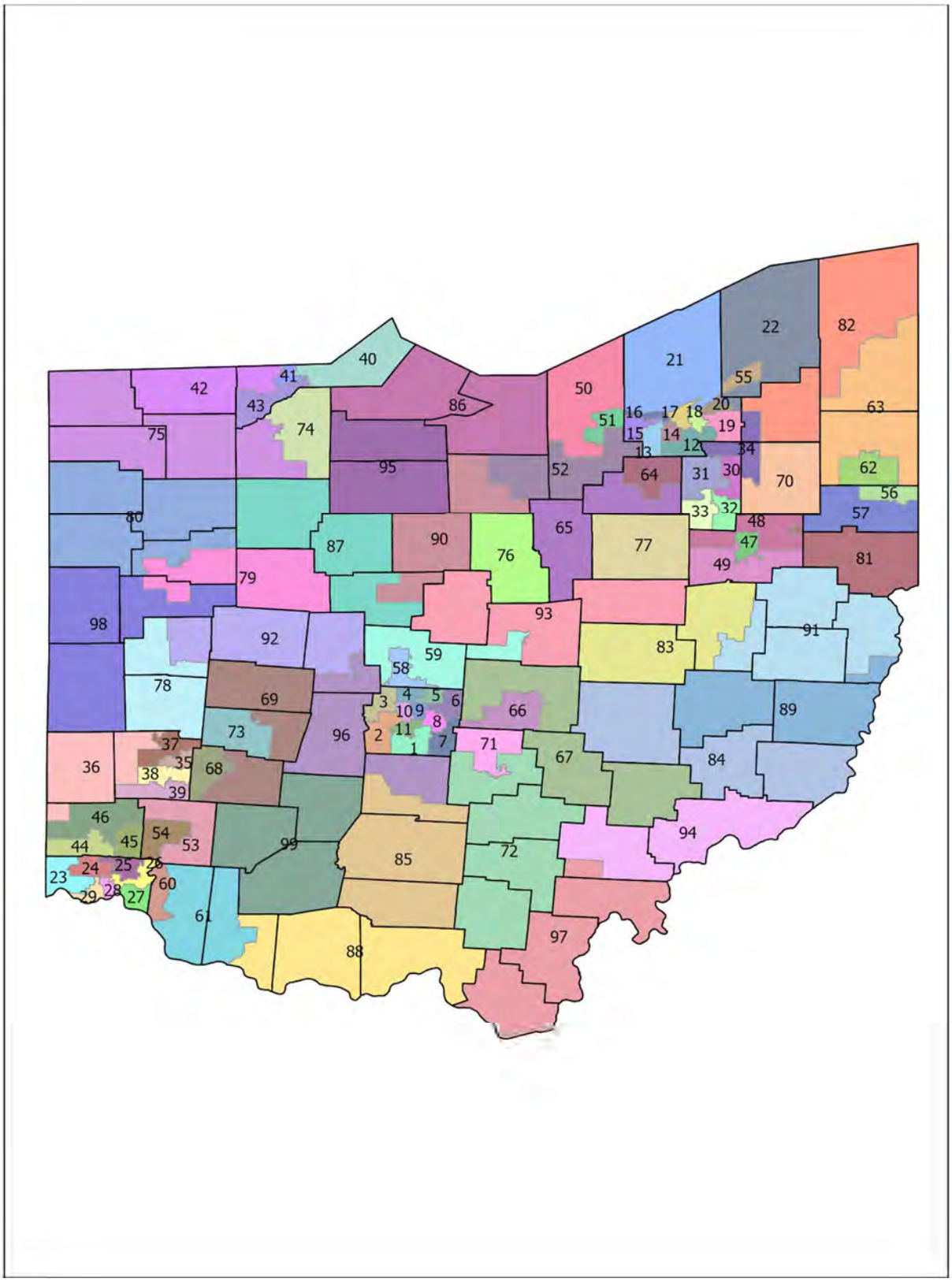
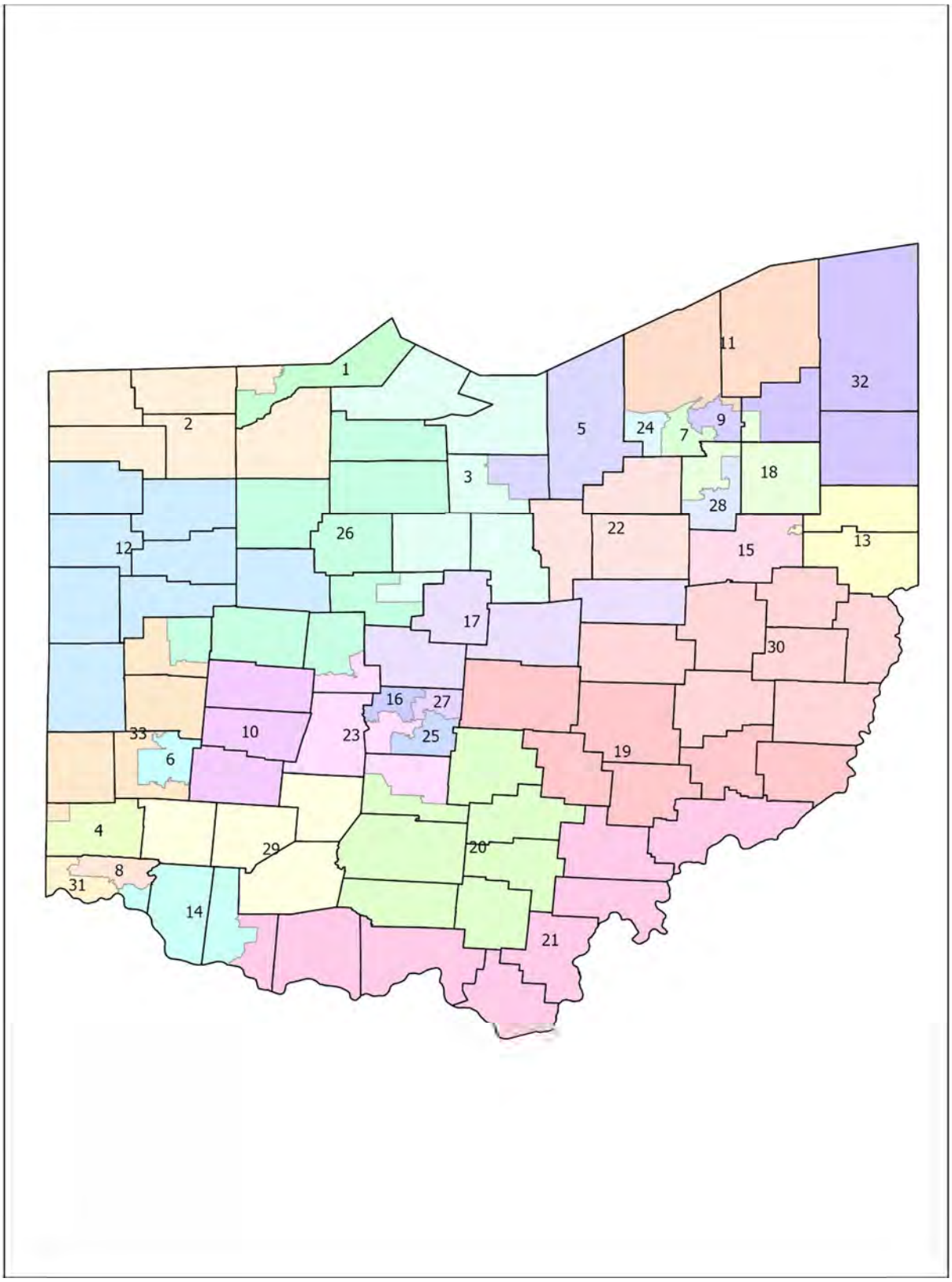

11
2
1
12
10
27
6
4
7
8
9
14
17
16
3
5
20
13
23
21
25
24
32
18
28
22
19
29
33
26
31
30
OHIO
WEST VIRGINIA
Charleston
Richmond
Wayne

Exhibit I

Rodden Alternative House Plan



Rodden Alternative Senate Plan



Rodden Decl. Ex. D

IN THE SUPREME COURT OF OHIO

Bria Bennett, *et al.*, **Petitioners,** **v.** **Ohio Redistricting Commission, *et al.*,** **Respondents.**	**Case No. 2021-1198** Original Action Filed Pursuant to Ohio Constitution, Article XI, Section 9(A) *[Apportionment Case Pursuant to S. Ct. Prac. R. 14.03]*

EXHIBITS TO BENNETT PETITIONERS' OBJECTIONS – VOLUME 3
(Affidavit of Dr. Jonathan Rodden & Exhibits)

Abha Khanna (PHV 2189-2021)
Ben Stafford (PHV 25433-2021)
ELIAS LAW GROUP LLP
1700 Seventh Ave, Suite 2100
Seattle, WA 98101
akhanna@elias.law
bstafford@elias.law
T: (206) 656-0176

Jyoti Jasrasaria (PHV 25401-2021)
Spencer W. Klein (PHV 25432-2021)
ELIAS LAW GROUP LLP
10 G St NE, Suite 600
Washington, DC 20002
jjasrasaria@elias.law
sklein@elias.law
T: (202) 968-4490

Donald J. McTigue* (Ohio Bar No. 0022849)
**Counsel of Record*
Derek S. Clinger (Ohio Bar No. 0092075)
MCTIGUE COLOMBO & CLINGER LLC
545 East Town Street
Columbus, OH 43215
dmctigue@electionlawgroup.com
dclinger@electionlawgroup.com
T: (614) 263-7000

Counsel for Petitioners
Bria Bennett et al.

Dave Yost
OHIO ATTORNEY GENERAL
Bridget C. Coontz (0072919)
Julie M. Pfeiffer (0069762)
30 E. Broad Street
Columbus, OH 43215
Tel: (614) 466-2872
Fax: (614) 728-7592
bridget.coontz@ohioago.gov
julie.pfeiffer@ohioago.gov

Counsel for Respondents
Governor Mike DeWine,
Secretary of State Frank LaRose, and
Auditor Keith Faber

W. Stuart Dornette (0002955)
Beth A. Bryan (0082076)
Philip D. Williamson (0097174)
TAFT STETTINIUS & HOLLISTER LLP
425 Walnut St., Suite 1800
Cincinnati, Ohio 45202-3957
T: (513) 381-2838
dornette@taftlaw.com
bryan@taftlaw.com
pwilliamson@taftlaw.com

Phillip J. Strach (PHV 25444-2021)
Thomas A. Farr (PHV 25461-2021)
John E. Branch, III (PHV 25460-2021)
Alyssa M. Riggins (PHV 25441-2021)
NELSON MULLINS RILEY & SCARBOROUGH LLP
4140 Parklake Ave., Suite 200
Raleigh, North Carolina 27612
phil.strach@nelsonmullins.com
tom.farr@nelsonmullins.com
john.branch@nelsonmullins.com
alyssa.riggins@nelsonmullins.com
T: (919) 329-3812

Counsel for Respondents
Senate President Matt Huffman and
House Speaker Robert Cupp

John Gilligan (Ohio Bar No. 0024542)
Diane Menashe (Ohio Bar No. 0070305)
ICE MILLER LLP
250 West Street, Suite 700
Columbus, Ohio 43215
John.Gilligan@icemiller.com
Diane.Menashe@icemiller.com

Counsel for Respondents
Senator Vernon Sykes and
House Minority Leader-Elect Allison Russo

DAVE YOST
OHIO ATTORNEY GENERAL
Erik J. Clark (Ohio Bar No. 0078732)
Ashley Merino (Ohio Bar No. 0096853)
ORGAN LAW LLP
1330 Dublin Road
Columbus, Ohio 43215
T: (614) 481-0900
F: (614) 481-0904
ejclark@organlegal.com
amerino@organlegal.com

Special Counsel to Ohio Attorney General
Dave Yost

Counsel for Respondent
Ohio Redistricting Commission

IN THE SUPREME COURT OF OHIO

Bria Bennett, *et al.*, **Petitioners,** **v.** **Ohio Redistricting Commission, *et al.*,** **Respondents.**	**Case No. 2021-1198** Original Action Filed Pursuant to Ohio Constitution, Article XI, Section 9(A) *[Apportionment Case Pursuant to S. Ct. Prac. R. 14.03]*

EXPERT AFFIDAVIT OF DR. JONATHAN RODDEN

I, Jonathan Rodden, having been duly sworn and cautioned according to law, hereby state that I am over the age of eighteen years and am competent to testify to the facts set forth below based on my personal knowledge and having personally examined all records referenced in this affidavit, and further state as follows:

I. INTRODUCTION AND SUMMARY

1. For the purpose of this report, I have been asked to examine whether and how the revised redistricting plan for the Ohio State House of Representatives and Ohio Senate, adopted by the Ohio Redistricting Commission on January 22, 2022, (attached as Exhibits A and B) ("Revised Plan"), addresses the standard set forth in Article XI, Section 6(B), namely, that "[t]he statewide proportion of districts whose voters, based on statewide state and federal partisan general election results during the last ten years, favor each political party shall correspond closely to the statewide preferences of the voters of Ohio."

2. As this Court stated in its January 12, 2022 opinion declaring invalid the General Assembly plan adopted by the Commission on September 16, 2021, "[i]f it is possible for a district plan to comply with Section 6 and Sections 2, 3, 4, 5, and 7, the commission must adopt a plan that does so." *League of Women Voters of Ohio v. Ohio Redistricting Comm.*, Slip Opinion No. 2022-Ohio-65 at ¶ 88.

3. I demonstrate that this "partisan proportionality" standard was once again clearly not met by the map adopted by the Ohio Redistricting Commission. In short, it was possible to draw General Assembly maps that both complied with the line-drawing requirements of Sections 2, 3, 4, 5, and 7 of Article XI of the Ohio Constitution and closely corresponded to the statewide preference of Ohio voters. Despite this fact, the Commission adopted a plan that does not closely correspond to such preferences.

4. In order to ascertain whether it was possible for the Commission to comply with both Section 6(B) and Sections 2, 3, 4, 5, and 7 of the Ohio Constitution, I submit my own alternative

maps (attached as Exhibits C and D). These maps are largely identical to the maps submitted to this Court as an attachment to my previous report in this case, dated October 22, 2021. I have made amendments to these maps to correct a few minor line-drawing issues (described in paragraph 27-28 below). I also renumbered the districts in the Senate map to ensure compliance with Article XI, Section 5; that is, I numbered the districts as if the Commission were ready to adopt this plan without revisions. Neither change impacted the partisan seat count of the map or led to a violation of another provision of Article XI.

5. I understand that, prior to the Commission's adoption of the Revised Plan, maps were submitted to the Commission that were identical to the ones I submit today (with the exception of the numbering of Senate districts, which I have now finalized).

6. The alternative maps attached as Exhibits C and D comply with each of the requirements of Sections 2, 3, 4, 5, and 7. They also produce a partisan breakdown that closely corresponds to the preferences of Ohio voters, with precise proportionality in the Senate, and a closer correspondence with partisan proportionality in the House than the Revised Plan. These maps also draw, on a plan-wide basis, more compact districts than those in the Revised Plan and split fewer counties.

7. Additionally, during my examination of the Revised Plan, I discovered that the plan contains multiple House districts that split more than one township or municipal corporation, in contravention of Article XI, Section 3(D)(3).

8. I also discovered that many of the purportedly Democratic districts in the Revised Plan's House map are actually toss-up districts in which the forecasted Democratic vote share is between 50 and 52 percent. For most of these districts, the vote share falls within the very close 50 to 51 percent range, likely making the seats up for grabs in any given election and highly responsive to changes in electoral conditions from cycle to cycle. By contrast, none of the Republican-leaning districts in the Revised Plan's House map fall within the 50 to 52 percent Republican range. This creates a false impression as to the parties' respective seat shares, since the Republican seat share is the minimum number of seats Republicans are likely to win, while the Democratic seat share is that party's likely maximum. This issue is compounded by the fact that almost all of these toss-up districts are held by Republican incumbents.

9. I was also asked to conduct a careful examination of the key geographic regions where the likely partisan outcomes associated with the Revised Plan were notably different from those associated with my map and the other alternative maps considered in my initial report. In most respects, my alternative plan is more respectful of traditional redistricting criteria than the Revised Plan. Above all, it produces districts with higher compactness scores and fewer county splits, while also producing a number of Democratic-leaning districts that is consistent with the partisan proportionality standard of Article XI, Section 6(B). Moreover, in and around metro areas, the Revised Plan still uses non-compact districts and splits communities, including Black communities, in order to avoid the creation of districts likely to elect Democratic candidates, opting instead to generate a series of districts with Democratic vote shares very slightly above 50 percent, almost all of which include Republican candidates who enjoy the advantages of incumbency.

II. QUALIFICATIONS

10. I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. I am engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including ballots and election results at the level of polling places, individual records of registered voters, census data, and survey responses. I am also a senior fellow at the Stanford Institute for Economic Policy Research and the Hoover Institution. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Exhibit E.

11. In my current academic work, I conduct research on the relationship between the patterns of political representation, geographic location of demographic and partisan groups, and the drawing of electoral districts. I have published papers using statistical methods to assess political geography, balloting, and representation in a variety of academic journals including *Statistics and Public Policy, Proceedings of the National Academy of Science*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the *Virginia Law Review*, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics.* One of these papers was selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the best paper on political economy published in the last year, and another received an award from the American Political Science Association section on social networks. In 2021, I received a John Simon Guggenheim Memorial Foundation Fellowship, and received the Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations."

12. I have recently written a series of papers, along with my co-authors, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science*, *Election Law Journal*, and *Political Analysis*, and it has been featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I have recently completed a book, published by *Basic Books* in June of 2019, on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts. The book was reviewed in *The New York Times*, *The New York Review of Books*, *Wall Street Journal*, *The Economist*, and *The Atlantic*, among others.

13. I have expertise in the use of large data sets and geographic information systems (GIS), and I conduct research and teaching in the area of applied statistics related to elections. My PhD students frequently take academic and private sector jobs as statisticians and data scientists. I frequently work with geo-coded voter files and other large administrative data sets, including in recent papers published in the *Annals of Internal Medicine* and *The New England Journal of Medicine.* I have developed a national data set of geo-coded precinct-level election

results that has been used extensively in policy-oriented research related to redistricting and representation.

14. I have been accepted and testified as an expert witness in several election law and redistricting cases: *Romo v. Detzner,* No. 2012-CA-000412 (Fla. Cir. Ct. 2012); *Mo. State Conference of the NAACP* v. *Ferguson-Florissant Sch. Dist.,* No. 4:2014-CV-02077 (E.D. Mo. 2014); *Lee v. Va. State Bd. of Elections,* No. 3:15-CV-00357 (E.D. Va. 2015); *Democratic Nat'l Committee et al. v. Hobbs et al.*, No. 16-1065-PHX-DLR (D. Ariz. 2016); *Bethune-Hill v. Virginia State Board of Elections*, No. 3:14-cv-00852-REP-AWA-BMK (E.D. Va. 2014); and *Jacobson et al. v. Lee*, No. 4:18-cv-00262 (N.D. Fla. 2018). I also worked with a coalition of academics to file Amicus Briefs in the Supreme Court in *Gill v. Whitford*, No. 16-1161, and *Rucho v. Common Cause*, No. 18-422. Much of the testimony in these cases had to do with geography, electoral districts, voting, ballots, and election administration. I recently worked as a consultant for the Maryland Redistricting Commission. I am being compensated at the rate of $550/hour for my work in this case. My compensation is not dependent upon my conclusions in any way.

III. DATA SOURCES

15. I have collected statewide election data for 2012 to 2020 from the Ohio Secretary of State. I also accessed precinct-level election results from the Ohio Secretary of State for statewide elections from 2016 to 2020 that were matched to 2020 Ohio vote tabulation districts by a team at Harvard University called the Algorithm-Assisted Redistricting Methodology Project.[1] Additionally, I accessed the Revised Plan approved by the Commission and uploaded to the web page of the Ohio Redistricting Commission, true copies of which are attached as Exhibits A and B.[2] For the analysis conducted in this report, I use three software packages: Stata, Maptitude for Redistricting, and ArcGIS Pro. In creating my maps, I used the same U.S. Census redistricting data used by the Ohio Redistricting Commission, as archived in the "Ohio University Common and Unified Redistricting Database."[3]

IV. MEASURING PARTISAN PROPORTIONALITY

16. The Ohio Constitution instructs the Commission to use "statewide state and federal partisan general election results during the last ten years" to ascertain the "statewide preferences of the voters of Ohio" and attempt to draw a map in which the "statewide proportion of districts whose voters favor each party . . . correspond[s] closely" to those "statewide preferences."

17. As this Court explained in its January 12, 2022 opinion in this case:

> As used in Article XI, Section 6(B) of the Ohio Constitution, the term "statewide preferences of the voters of Ohio" means the percentages of votes received by the candidates of each political party based on the total votes cast in statewide state and federal

[1] https://alarm-redist.github.io/posts/2021-08-10-census-2020/
[2] https://redistricting.ohio.gov/maps
[3] https://www.redistricting.ohio.gov/resources

> partisan elections during the preceding ten years. In this case, there is no dispute that under this methodology, which looks at votes cast in statewide elections over the relevant period, about 54 percent of Ohio voters preferred Republican candidates and about 46 percent of Ohio voters preferred Democratic candidates.

League of Women Voters of Ohio v. Ohio Redistricting Comm., Slip Opinion No. 2022-Ohio-65 at ¶ 108. Thus, the Commission must attempt to draw a plan with a seat share that "closely corresponds" to a breakdown of 54 percent in favor of Republicans and 46 percent in favor of Democrats.

18. Determining the proportion of districts that favor each party, based on consideration of the relevant elections identified in Article XI, Section 6, requires an aggregation of the precinct-level results of these past elections to the boundaries of a map's proposed districts. However, precinct-level election results linked with geo-spatial boundaries were not available for the 2012 and 2014 elections, as the Commission itself acknowledged in its initial Article XI, Section 8(C)(2) Statement (accompanying the since-struck down September 16, 2021 General Assembly plan), attached as Exhibit H. As discussed in my previous report to this Court, using the full statewide election results from 2012 to 2020, the statewide preferences of Ohio voters must be translated into state legislative maps in which 45.9 percent of seats favor Democrats and 54.1 percent of seats favor Republicans. Since there are 99 seats in the Ohio House of Representatives, a statewide vote share of 45.9 percent would be associated with 45.44 Democratic seats, which rounds down to 45 seats. Similarly, a 45.9 percent vote share would be associated with about 15.15 Democratic seats in the 33-member Ohio Senate, which rounds down to 15 seats.

19. As was the case in my previous report, I opted to use the Commission's precise methodology for ascertaining each party's seat count under the Revised Plan. I do so not as an endorsement of the methods used by the Commission, but rather, in order to facilitate apples-to-apples comparison. Accordingly, I aggregated the precinct-level results of each election from 2016 to 2020 to the level of the districts in the Revised Plan. For each district, I calculate the average Democratic share of the votes received by the candidates of the two major parties across each of these elections. I then ascertain the number of districts in which this quantity is greater than 50 percent. Using this technique, I determine that the Revised Plan produced 42 majority-Democratic House seats and 57 majority-Republican House seats, as shown in Table 1 below. In the Senate, the Revised Plan produced 13 majority-Democratic Senate seats and 20 majority-Republican seats, as shown in Table 2 below. Both of these maps fall short of partisan proportionality, by two seats in the Senate and three seats in the House.

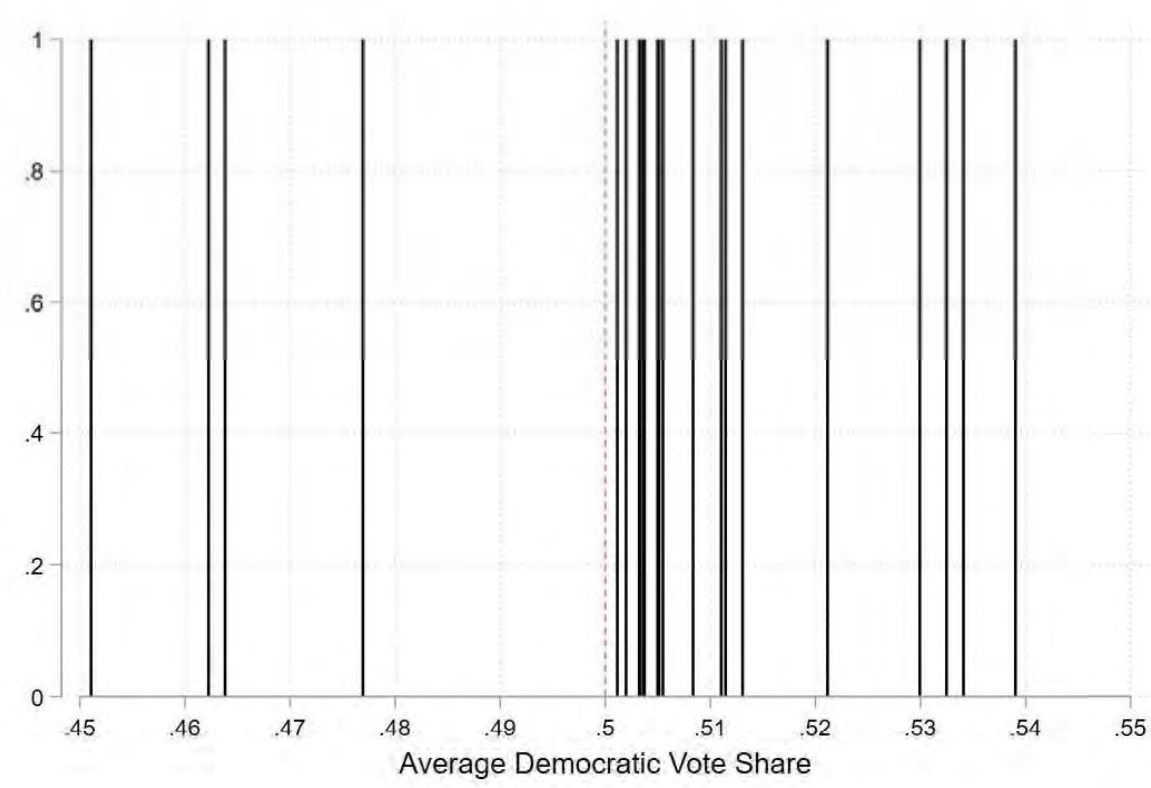
20. In addition to this examination of seats above and below the 50 percent cut-point, it is also useful to examine how many of the Democratic- and Republican-leaning seats are razor-thin majorities, and how many are more comfortable majorities. I count the number of seats where the average Democratic share of the vote for the two major parties was less than 48 percent—let us call these "expected Republican seats." And I count the number of seats where the average Democratic share of the vote for the two major parties was greater than 52 percent—let us call these "expected Democratic seats." Finally, I count the number of seats that we

might call "toss-ups," where the average Democratic vote share was between 48 percent and 52 percent.

21. As set forth in Table 1 below, in the Revised Plan, all of the majority-Republican House seats are greater than 52 percent Republican. Of the 42 majority-Democratic seats, only 29 are greater than 52 percent Democratic. The main difference between the invalidated plan and the Revised Plan is the creation of an additional set of toss-up seats that are nominally Democratic. All 13 of the toss-up seats are slim Democratic majorities. As set forth in Table 2, in the Commission's Senate plan, there are 19 expected Republican seats, 9 expected Democratic seats, and 5 toss-ups, of which 4 have a slim Democratic majority and 1 has a slim Republican majority.

22. Indeed, a large number of nominally Democratic-leaning seats (as identified using the Commission's methodology) reflect razor-thin margins. Figure 1 provides a discrete histogram of the average Democratic vote share in the House districts of the Revised Plan. Each vertical line corresponds to a district. I display the range of districts with an average Democratic vote share between 45 percent and 55 percent.

Figure 1: Discrete Histogram of District-Level Average Democratic Vote Share, Revised House Plan[4]



[4] Note that this chart does not include very safe seats, which have partisan indices of lower than 45 or greater than 55 percent.

23. Figure 1 demonstrates a remarkable "bunching" of 10 districts between 50 percent and 51 percent, with an additional 3 districts with a Democratic vote share a little over 51 percent. In contrast, there are no Republican-leaning districts in this range.

24. As explained further below, by generating a large number of seats with comfortable Republican majorities and a set of toss-up seats with very slim Democratic majorities, the Commission has generated plans that would provide the Republican Party with a majority of seats even in the event of a very comfortable Democratic statewide victory.

25. This discrepancy in the allocation of toss-up seats is more severe than the previous plan approved by the Commission on September 16, 2021 (the "Invalidated Plan"). In that plan, all of the majority-Republican seats in the House were similarly greater than 52 percent Republican, while the 5 toss-up seats were Democratic-leaning.

V. COMPARING THE REVISED PLAN TO MY ALTERNATIVE PLAN

26. On October 22, 2021, I produced to this court my own redistricting plan for the Ohio House and Senate ("Rodden I"). As described in my previous report, the plan created 43 Democratic seats in the House and 15 Democratic seats in the Senate.

27. Following the Court's January 12, 2022 order striking down the Invalidated Plan, I conducted another review of the Rodden I plan in conjunction with its potential submission to the Commission for consideration in the remedial process. In doing so, I discovered that my proposed plan contained a few technical line-drawing issues.

28. The technical issues I discovered consisted of the following:

- A few small sets of largely unpopulated census tracks being separated from their townships and municipalities;
- Certain district lines being drawn to follow township boundaries instead of municipal boundaries.

29. After discovery of these issues, I promptly revised the plan to correct each of the items described above. These revisions did not impact the plan's partisan seat count or its compliance with any other provision of Article XI. They were not difficult to make.

30. I understand that a revised version of my initial plan was submitted to the Commission by Petitioners Bria Bennett and the League of Women Voters on January 20, 2022.

31. Section 5 of Article XI requires that, for incumbent Senators not running for office in the election following a redistricting (here, the 2022 election), the number that corresponds to the district each such Senator represents must be assigned to a district containing the largest portion of the population of the candidate's previous district. Thus, once a Senate plan is finalized, incumbents are assigned to specific districts, and those districts are numbered accordingly.

The map I submitted did not assign incumbents to specific districts, as it was not clear whether the Commission would consider the plan at all or, if it did, make further changes to it that required renumbering districts.

32. In my submission to this court ("Rodden II"), attached as Exhibits C and D, I have renumbered the Senate districts in compliance with Section 5 and present this Court with a map that is in adoption-ready form. The renumbering of the map in no way impacted any district boundaries nor the partisan seat share of the map. Aside from this renumbering of Senate districts, the maps attached as Exhibits C and D are identical to the maps submitted by Petitioners Bennett and League of Women Voters to the Commission on January 20.

33. Rodden II fully complies with each of Article XI's provisions, including the subdivision split provisions of Sections 3 and 4, and the district-numbering provisions of Section 5.

34. Rodden II also performs better than the Revised Plan in terms of the number of county splits. The total subdivision splits from each county are set forth in Tables 1 and 2 below. In total, Rodden II splits 32 counties on the House side and 15 on the Senate side. By contrast, the Revised plan splits 37 counties on the House side and 17 on the Senate side. For both the House and the Senate, the Revised Plan splits a greater number of counties than the Invalidated Plan.

35. In compliance with Article XI, Section 3(D)(3), Rodden II does not split more than one municipal corporation or township in any House district.

36. The Revised Plan, on the other hand, violates Section 3(D)(3) in its House map in several instances. First, the Revised Plan's House map splits both Akron and Copley between Districts 31 and 33, as can be seen in Figure 2 below. Figure 2a shows a place along the border between Districts 31 and 33 where Copley Township is split, and Figure 2b displays a place along the same border where the City of Akron is split.

Figure 2a: Split of Copley Township between Districts 31 and 33, Summit County

Figure 2b: Split of Akron between Districts 31 and 33, Summit County

37. Second, the Revised Plan's House map splits *three* cities and townships between Districts 10 and 5: the city of Columbus (see Figure 3a below), Grove City (Figure 3b), and Jackson Township in several different places (see Figures 3c, d, and e).[5]

Figure 3a: Split of Columbus between Districts 10 and 5, Franklin County

[5] The above analysis does not include instances where the Revised Plan splits more than one municipal corporation or township in a district and only one such split contains populated areas of a municipal corporation or township on both sides of the district line. For example, the Revised Plan splits Columbus and New Albany between Districts 4 and 9. Howevever, only Columbus has populated areas in both districts. New Albany, on the other hand, has population only in District 4, and any portion of its territory extending into District 9 is unpopulated. My discussion of splits in this report is limited only to those instances where the Revised Plan splits the populated regions of more than one municipal corporation or township between two districts.

Figure 3b: Split of Grove City between Districts 10 and 5, Franklin County

Figure 3c: First Split of Jackson Township between Districts 10 and 5, Franklin County

Figure 3d: Second Split of Jackson Township between Districts 10 and 5, Franklin County

Figure 3e: Third and Fourth Splits of Jackson Township between Districts 10 and 5, Franklin County

38. Although my understanding is that Section 3(E)(1)(a) of Article XI allows the Commission to create a district that splits "two municipal corporations or townships whose contiguous portions do not contain a population of more than fifty per cent, but less than one hundred precent, of one ratio of representation"—provided that it is not possible to comply with Section 3(D)(3)—this section does not apply to the splits described above. First, the municipal and township splits between Districts 10 and 5 are not justifiable under Section 3(E)(1)(a) because those split *three* cities and townships, while that provision allows for only

two such splits. Second, my understanding is that the Commission did not provide an explanation of those splits together with its approved plan, as set out in Section 3(E)(1)(d).

39. Rodden II also performs better than the Revised Plan on plan-wide compactness under Reock, Polsby-Popper, and Area/Convex Hull scores. The scores for the two plans are reproduced in Table 1 below for the House and Table 2 for the Senate.

40. As discussed, the revisions to Rodden I reflected in Rodden II did not impact the new plan's seat share. As a result, Rodden II again contains 43 Democratic seats in the House and 15 Democratic Seats in the Senate. This achieves proportionality in the Senate while coming within two seats of proportionality in the House.

41. The Revised Plan, by contrast, falls short of proportionality in both houses, containing 42 seats with average Democratic vote shares above 50 percent in the House and 13 such seats in the Senate (again, using the Commission's methodology), as set forth in Tables 1 and 2 below.

42. As noted above, the Revised House Plan also creates a large number of Democratic-leaning "toss-up" districts, while creating no such districts for Republicans. Particularly with regard to the 10 Democratic House seats between 50 and 51%, this razor-thin Democratic margin could be easily overcome by specific circumstances such as incumbency advantage or even a mildly favorable electoral environment. In fact, as discussed further below, almost all of the new "toss-up" districts created in the Revised Plan have Republican incumbents, who are more likely to outperform partisan indices in a given election as compared to other candidates.

43. Thus, the concessions the Revised Plan does make in the direction of proportionality come exclusively in the form of highly competitive toss-up districts, which only fall in the Democratic category because they contain a forecasted Democratic vote share just slightly above 50%. As demonstrated with Figure 1 above, many of the purportedly Democratic districts under the Revised Plan are, in truth, up for grabs in any given election, while the Republican districts are quite safe. In other words, the Republican seat share of 58 percent in the House set forth in Table 1 operates as a likely floor for Republicans: even in a Democratic wave election in which Republicans lose every toss-up district, Republicans will nonetheless likely win the seats forecasted under the Commission's methodology. At the same time, the Democratic seat share of 42 percent in the House is a likely ceiling: if they win *every* toss-up seat, they will likely only achieve the number of forecasted Democratic seats.

Table 1: House Maps Comparison Between Rodden II and the Commission's Revised Plan

	Commission Revised Plan	Rodden II Plan
Average compactness scores		
(Higher scores = more compact)		
Reock	0.40	0.41
Polsby-Popper	0.30	0.36
Area/Convex Hull	0.74	0.79
Number of split counties	37	32
# of seats with average two-party *Democratic* vote share >.5	42	43
Expressed as percentage of seats	42.4%	43.4%
# of seats with average two-party *Republican* vote share >.5	57	56
Expressed as percentage of seats	57.6%	56.6%
Distance from proportional seat allocation (seats)	3	2
Expressed as percentage of seats	3.0%	2.0%
# of seats with average two-party Democratic vote share >.52	29	39
Expressed as a percentage of seats	29.3%	39.4%
# of seats with average two-party Democratic vote share <.48	57	56
Expressed as percentage of seats	57.6%	56.6%
# of seats with average two-party Democratic vote share between .48 and .52	13	4
Expressed as percentage of seats	13.1%	4.0%

Table 2: Senate Maps – Comparison Between Rodden II and the Commission's Revised Plan

	Commission Revised Plan	Rodden II Plan
Average compactness scores		
(Higher scores = more compact)		
Reock	0.41	0.44
Polsby-Popper	0.30	0.37
Area/Convex Hull	0.74	0.78
Number of split counties	17	15
# of seats with average two-party Democratic vote share >.5	13	15
Expressed as percentage of seats	39.4%	45.5%
# of seats with average two-party *Republican* vote share >.5	20	18
Expressed as percentage of seats	60.6%	54.5%
Distance from proportional seat allocation (seats)	2	0
Expressed as percentage of seats	6.1%	0
# of seats with average two-party Democratic vote share >.52	9	12
Expressed as a percentage of seats	9.1%	12.1%
# of seats with average two-party Democratic vote share <.48	19	18
Expressed as percentage of seats	57.6%	54.5%
# of seats with average two-party Democratic vote share between .48 and .52	5	3
Expressed as percentage of seats	5.1%	3.0%

44. Even if toss-ups are not considered in this analysis, and one takes the Commission's approach whereby any seat with a Democratic seat share of over 50% is classified as Democratic-leaning, the Revised Plan falls short of proportionality. As described above, the Revised Plan deviates from a proportional seat share by three seats in the House and two seats in the

Senate. Its failure to achieve proportionality is not due to a need to comply with other provisions of Article XI. This is made clear by Rodden II, which, of particular note, achieves perfect proportionality in the Senate, without violating any other Article XI rules. In fact, Rodden II achieves this with districts that are substantially more compact, split fewer counties, and are more attentive to traditional redistricting principles.

VI. ANALYSIS OF SPECIFIC REGIONS WITHIN THE REVISED COMMISSION PLAN

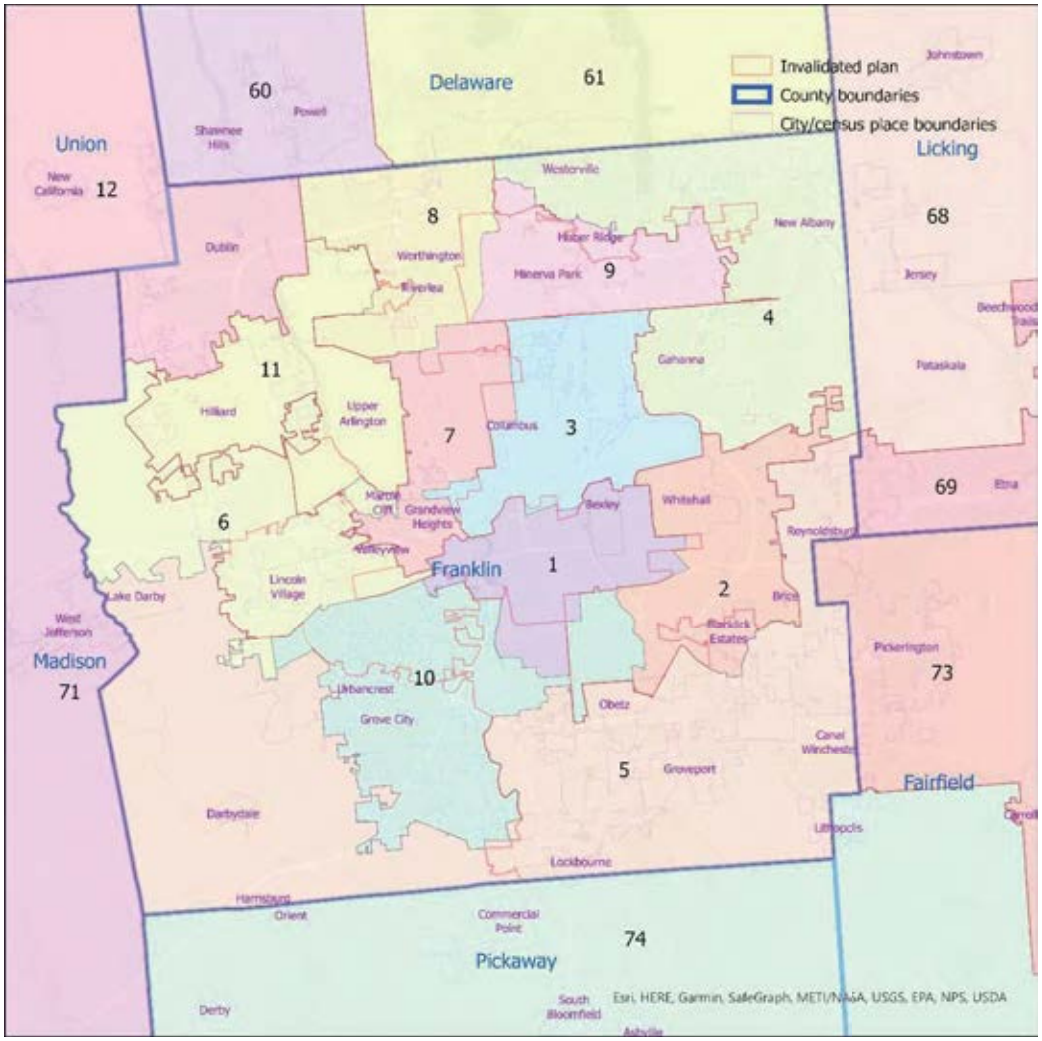
45. The above makes clear that the Revised Plan falls short of partisan proportionality, despite the fact that it was possible to draw a map that closely corresponds to the statewide preferences of Ohio voters without violating any of Article XI's other provisions. As described above, the Revised Plan differs from the invalidated plan in that it produces a handful of additional toss-up districts. This was achieved in part by taking voters from existing majority-Democratic districts—in some cases turning comfortable Democratic districts into toss-up districts. It was also achieved by taking comfortable Republican districts with Republican incumbents and moving some Democratic voters in, thereby turning them into toss-up districts.

46. In this section, I will take a closer look at specific districting choices made by the drawers of the Revised Plan in various regions of the state. This exercise will help to further demonstrate that the disproportionality of the Revised Plan is not required to achieve compliance with Article XI, but rather reflects deliberate partisan choices.

Franklin County

47. Figure 4 uses unique colors to display the districts of the Revised Plan in Franklin County. It also includes the invalidated boundaries in red. In my earlier expert report, I described a long, non-compact North-South district on the West side of Franklin County that carved out a comfortable Republican district. It has been removed. In its place, however, is a highly non-compact District 5 that traverses the entire Southern boundary of the Franklin County, also grabbing exurbs to the East and West. This district has an average Democratic vote share of around 52 percent. The Revised Plan also creates a rather non-compact District 10 around a Republican incumbent who won with 58 percent of the vote in 2018 and 55.5 percent in 2020. District 10 has an average Democratic vote share of 50.5 percent. And, like the Invalidated Plan, the Revised Plan reflects the unnecessary effort to extract Dublin from Franklin County and attach it with rural Union County

Figure 4: Franklin County



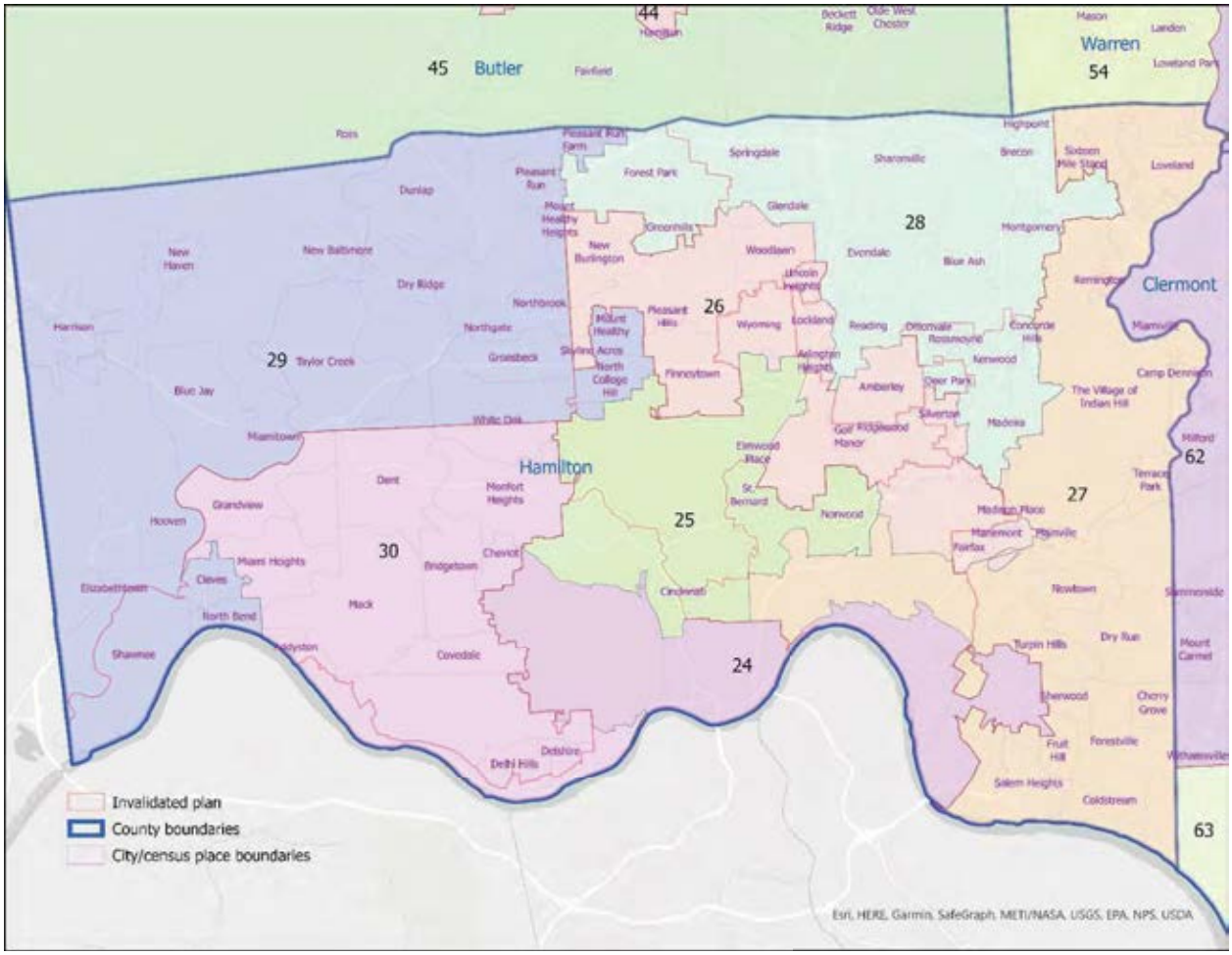
48. The Franklin County districts in the Revised Plan are still unnecessarily non-compact. The average Polsby-Popper score for the Franklin County districts is .22, in contrast with .37 in Rodden II. Recall that higher scores indicate greater compactness. The average Reock score for the Franklin County districts of the revised plan is .38, while for Rodden II it is .47. Moreover, Rodden II does not split Franklin County.

Hamilton County

49. In my earlier report, I described a Hamilton County arrangement in the Invalidated Plan that made some moves that split communities of interest in order to produce two comfortable Republican seats in the Western suburbs of Cincinnati. In particular, District 29 combined a largely white exurban and rural area with a suburban community with a large Black population, Forest Park. The Revised Plan removes Forest Park from District 29, but simply

replaces it with another metro Cincinnati community with a large minority population—this time North College Hill. There are other small changes in the Western suburbs as well, but the configuration with two comfortable Republican suburban districts, 29 and 30, is retained. District 28 is also altered, but it remains a tossup district, as in the Invalidated Plan.

Figure 5: Hamilton County

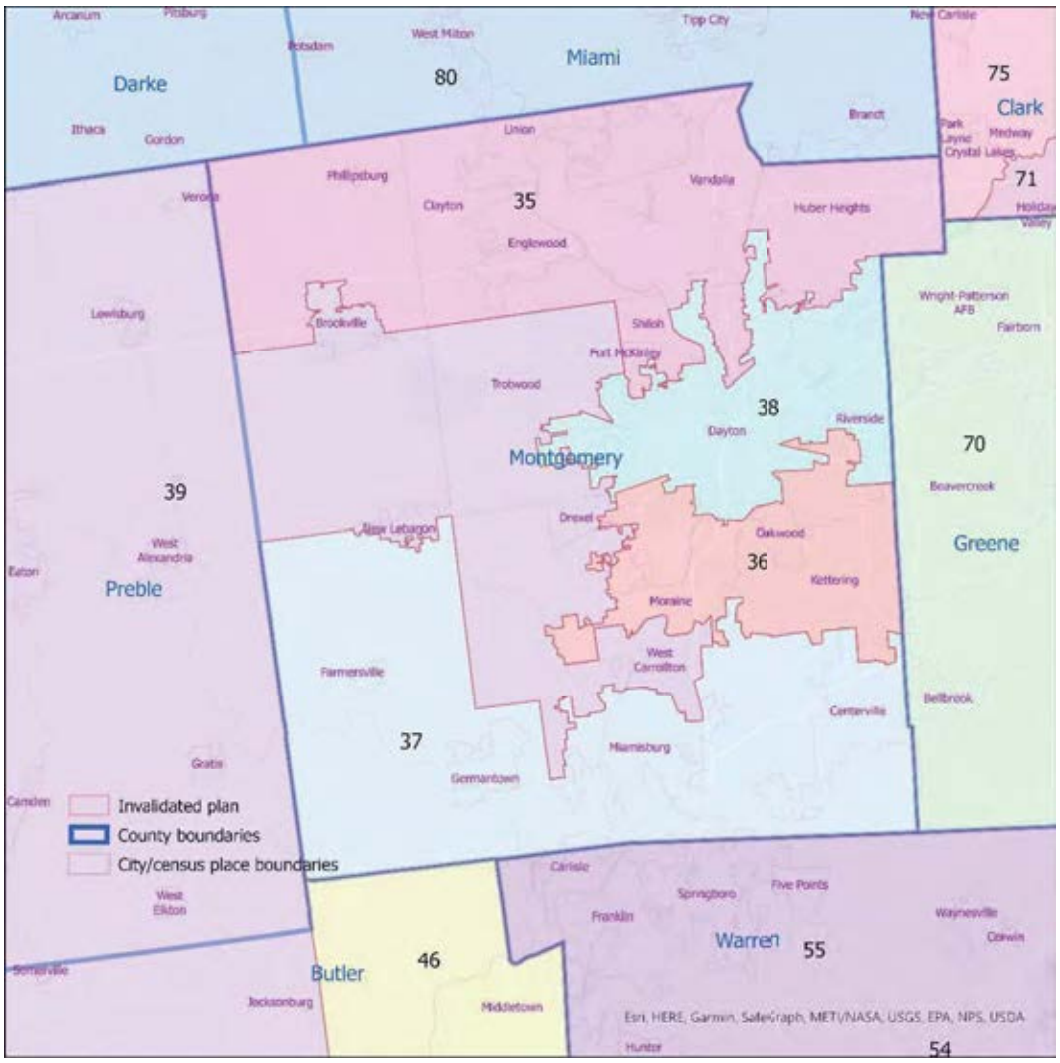


50. A somewhat more consequential change was made on the Eastern side of the county. There is still a long, non-compact North-South district, numbered 27, on the Eastern border of the county built around the incumbent Republican, Representative Brinkman. This district has been redrawn to become even less compact, reaching into Cincinnati in order to extract just enough Democratic voters to reach the 50 percent threshold. It has an average Democratic vote share of 50.2 percent.

51. The Cincinnati districts are unnecessarily non-compact. The average Polsby-Popper Score for the Hamilton County districts is .175, in contrast with .26 for the Rodden II Plan. The average Reock score for the Revised Plan is .33, while for the Rodden II Plan it is .43.

Montgomery County

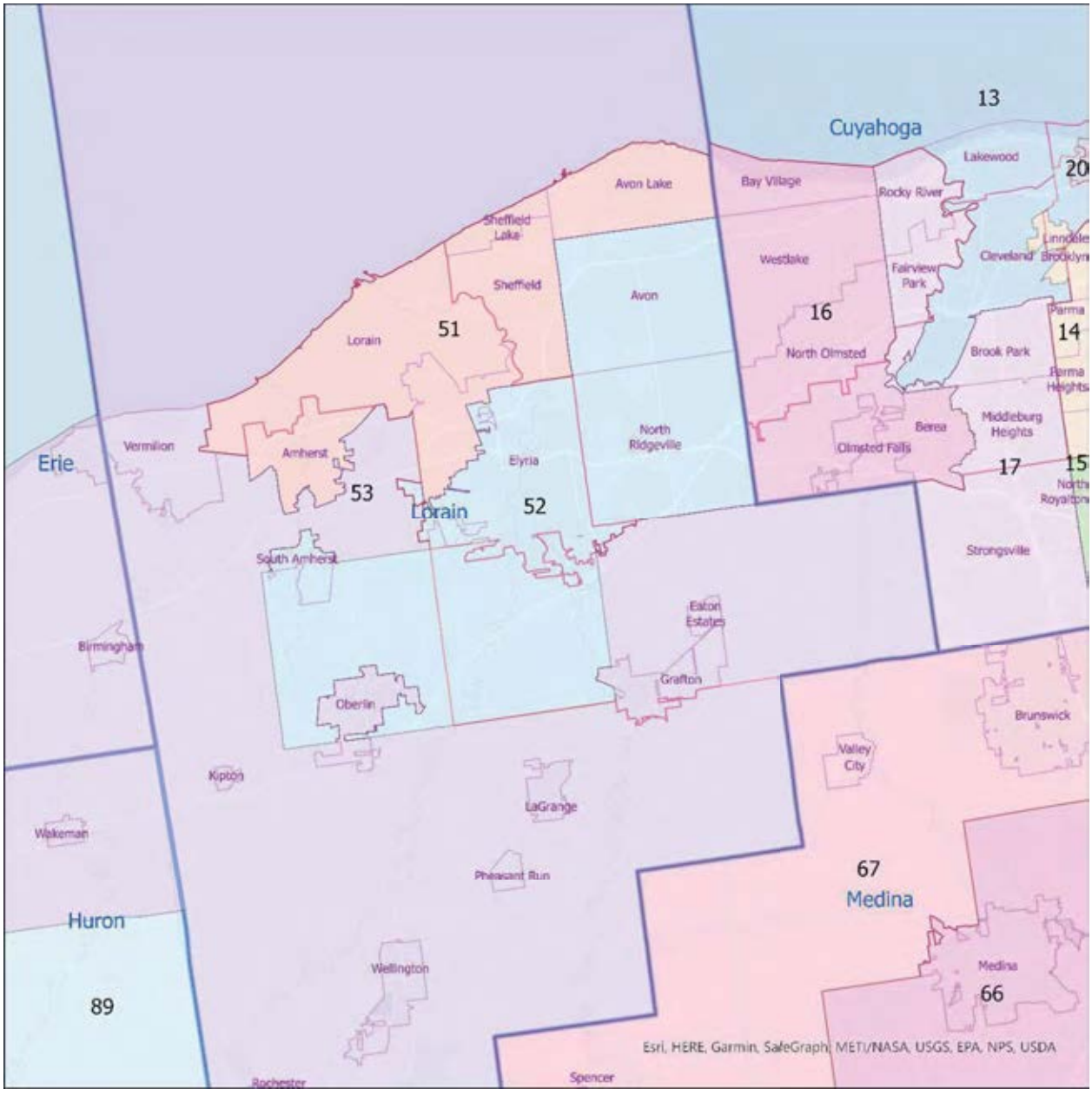
Figure 6: Montgomery County



52. In my earlier report, I pointed out that the Commission's plan took the relatively compact Black community of metropolitan Dayton and scattered it across 4 separate districts. Fragments of Dayton's Black community are combined with various suburban, majority-white districts in order to generate 3 districts with comfortable Republican majorities. A key part of this approach was to extract the Black community of Trotwood and other areas on the West side of Dayton and combine them with rural Preble County to the West. As can be seen in Figure 6, this structure has not changed. In fact, the entirety of the Invalidated Plan remains the same in Montgomery County.

Lorain County

Figure 7: Lorain County

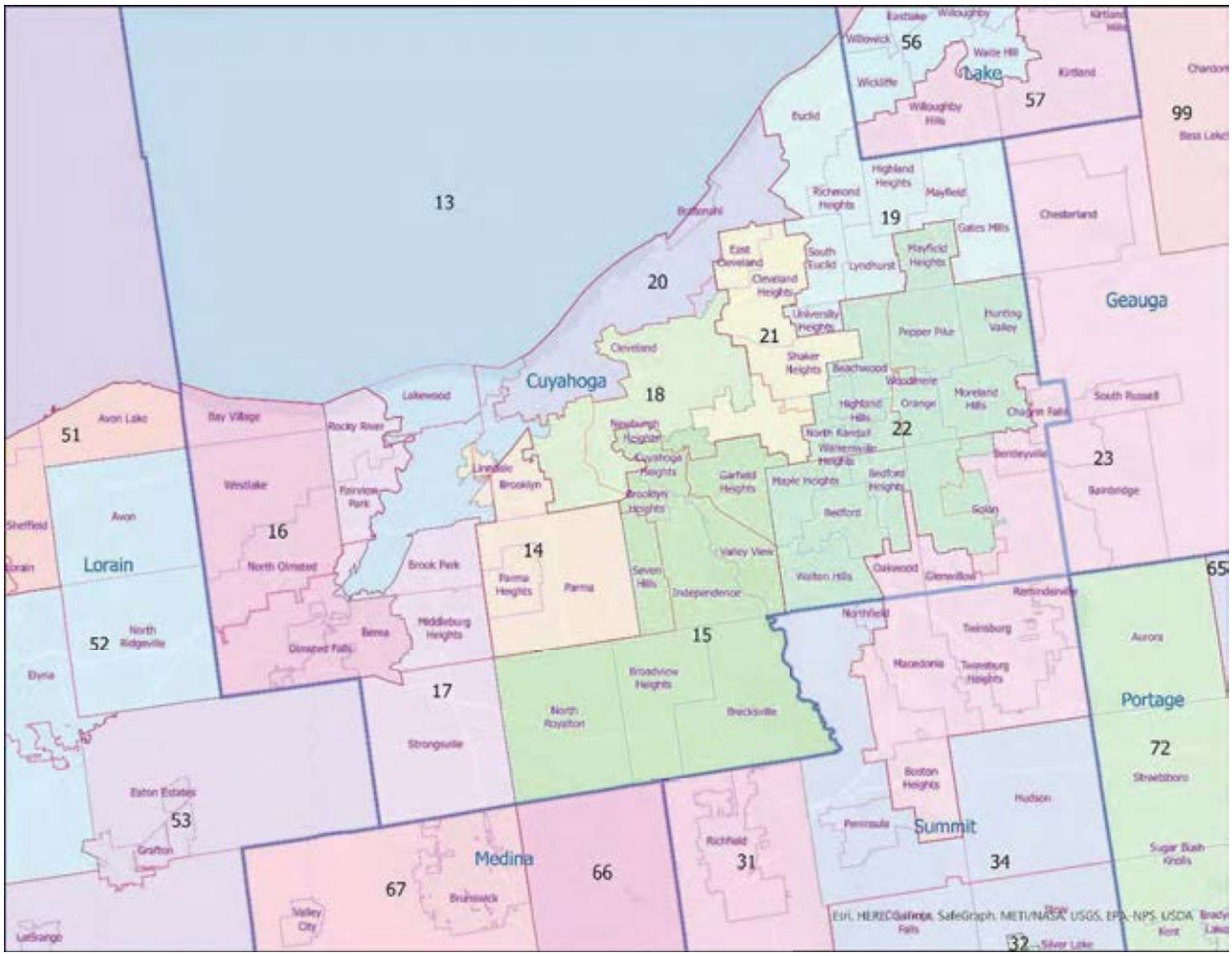


53. My previous report pointed out that the invalidated plan combined the cities of Elyria and Lorain into a very Democratic district with a 5 percent population deviation, which had the effect of creating two comfortable Republican districts in the remainder of the county. The Revised Plan now separates the two cities. The reconfigured Elyria-based district is drawn

to include a Republican incumbent, Gayle Manning, who received 56 percent of the vote in 2020, and 55 percent in 2018, though the district has an average statewide Democratic vote share of 50.3 percent, making it nominally Democratic-leaning. Note that this razor's edge vote share was obtained by carefully extracting the highly-Democratic city of Oberlin from the district (see Figure 7).

Cuyahoga

Figure 8: Cuyahoga County



54. In Cuyahoga County, the version of District 17 in the invalidated map traversed the Southern tier of Cuyahoga County, and it was solidly Republican. The previous version of Parma-based District 15 was slightly over 50 percent Democratic. A substantial reconfiguration has taken place in order to produce an additional toss-up district. The reconfigured version of District 17 is a highly non-compact district based in the suburbs of Southwestern Cuyahoga County, reaching up via a very narrow corridor around Cleveland Hopkins International

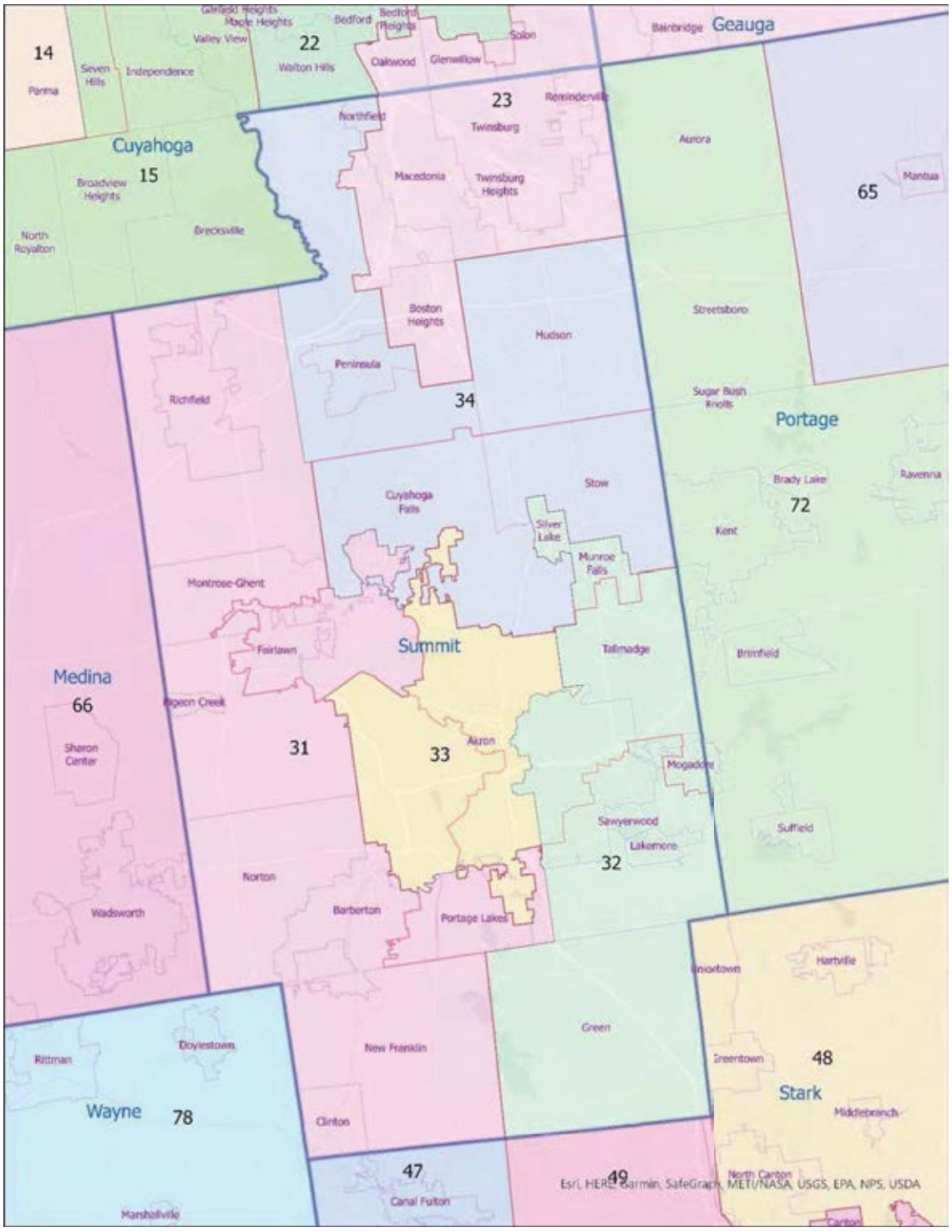
Airport to extract a narrow sliver of Democratic communities near the lake, ultimately turning District 17 into a tossup, with a 50.5 percent Democratic vote share. As with most of the other newly crafted toss-up districts, District 17 contains a successful Republican incumbent—in this case, one who received 61 percent of the vote in 2018 and 58 percent in 2020.

Summit

55. In the invalidated configuration of Summit County, Districts 32, 33, and 34 were Democratic-leaning districts that contained parts of Akron, but a safely Republican District 31 was built to snake around the Western and Northern border of the county. District 31 is still a highly non-compact district that reaches all the way from the Northern border to the Southern border of the county, but some voters have been extracted from Akron to make District 31 a toss-up, with a Democratic vote share of 50.5 percent. This was also achieved by removing some Democratic voters from District 32, moving it from an expected Democratic district to a tossup, at 50.8 percent. In keeping with the pattern described above, both of these districts contain Republican incumbents. In other words, while the Invalidated Plan had three expected Democratic districts and one expected Republican district, the revised configuration includes two expected Democratic districts and two toss-ups.

56. The Revised plan achieves this by using a non-compact configuration. Its average Polsby-Popper score is .19, with a Reock score of .33. The Summit County configuration in Rodden II, which included four expected Democratic seats, was far more compact, with an average Polsby-Popper score of .32, and a Reock score of .44.

Figure 9: Summit County



VII. CONCLUSION

57. It is possible to draw a plan that more closely corresponds with Ohioans' statewide voting preferences than the Revised Plan while complying with Article XI's other provisions, and the Revised Plan's remaining deviations from proportionality can only be understood as an attempt to secure partisan advantage for Republicans. Rodden II demonstrates that it was possible to comply with Section 6(B)'s proportionality requirement, while at the same time complying with Article XI's other requirements. Additionally, the Revised Plan creates an inordinate number of Democratic-leaning toss-up seats, many of which have a razor-thin margin of between 50 and 51 percent, giving the false impression that these districts are likely to go to Democrats when, in actuality, they are up for grabs. The problem with this is not competitive seats *per se*—which the political science literature indicates can be good for voters and enhance democratic accountability—but rather the disproportionate number of competitive seats that slightly lean in the Democrats' favor. Such a distribution may indicate an intent to favor one party over the other, and may not result in actual proportional partisan representation given the disparity across the two major parties. This problem is compounded by the fact that most of these tossups have Republican incumbents, who are likely to perform better than an index based on past statewide elections might project. Finally, a localized analysis of specific redistricting decisions within the Revised Plan further confirms that the Revised Plan's lack of proportionality was not the result of a need to comply with other Article XI provisions, but rather, the consequence of a deliberate choice on the part of mapmakers to benefit Republican legislative candidates.

Jonathan Rodden

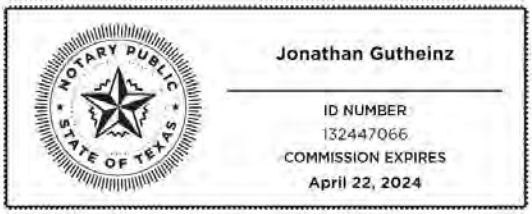
_____

Jonathan Rodden

Sworn to before me this 25th day of January 2022.

_____

Notary Public



My commission expires 04/22/2024

Notarized online using audio-video communication

How to Verify This Transaction

Every Notarize transaction is recorded and saved for a minimum of five years. Whether you receive an electronic or printed paper copy of a Notarize document, you can access details of the transaction and verify its authenticity with the information below.

To get started, visit verify.notarize.com and enter this information:

Notarize ID:	M48BMRXD
Access PIN:	TBVGBT

For more information on how to verify Notarize transactions, please visit:
support.notarize.com/notarize-for-signers/verifying-document-authenticity

Notarize

Exhibit A

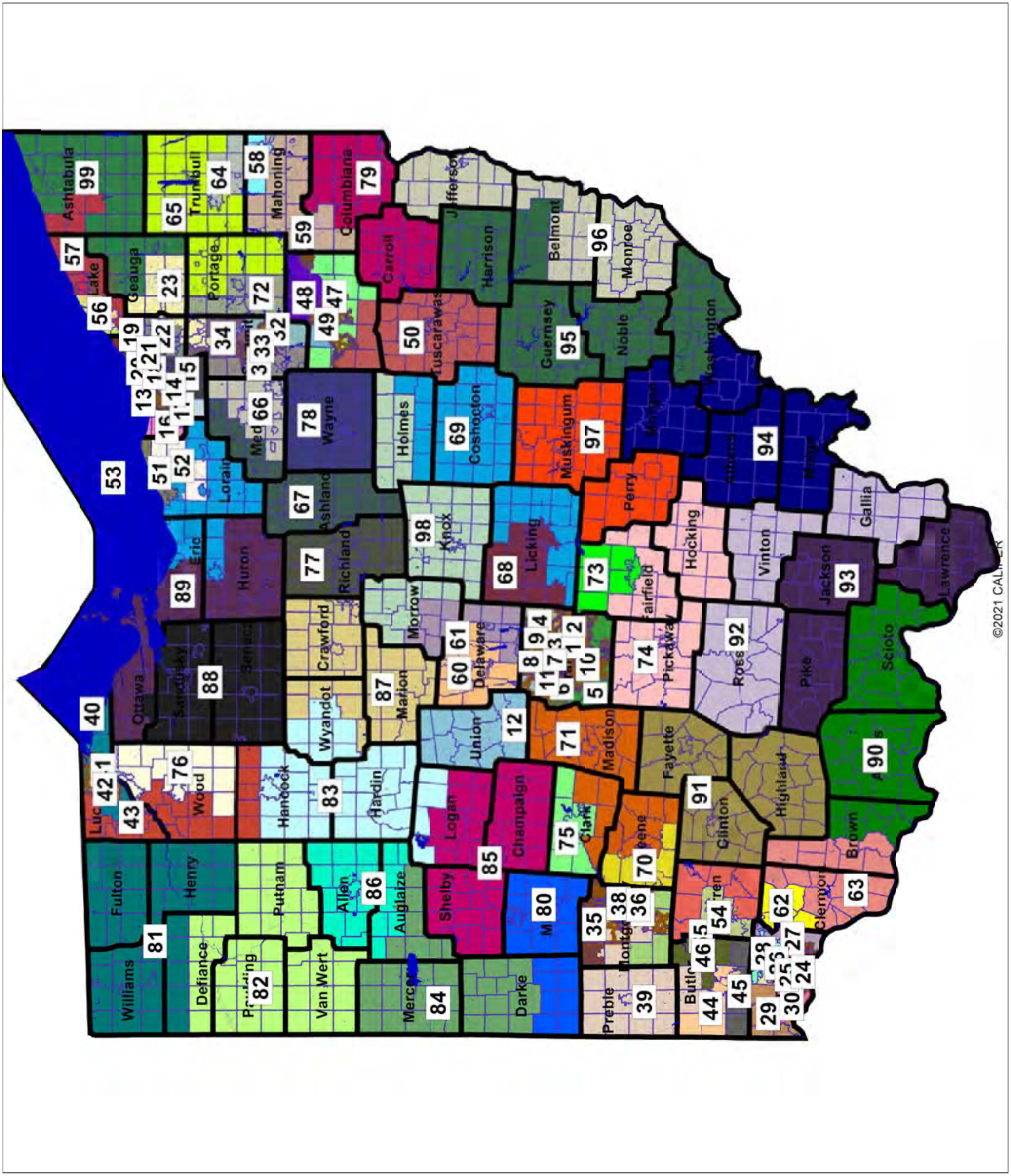

Ashtabula
Trumbull
Mahoning
Columbiana
Jefferson
Harrison
Belmont
Monroe
Carroll
Tuscarawas
Guernsey
Noble
Washington
Lake
Geauga
Portage
Coshocton
Holmes
Wayne
Muskingum
Perry
Morgan
Athens
Meigs
Lorain
Medina
Ashland
Knox
Licking
Fairfield
Hocking
Vinton
Gallia
Jackson
Lawrence
Erie
Huron
Richland
Morrow
Delaware
Pickaway
Ross
Pike
Scioto
Ottawa
Sandusky
Seneca
Crawford
Wyandot
Marion
Union
Madison
Fayette
Highland
Adams
Brown
Clermont
Lucas
Wood
Hancock
Hardin
Logan
Champaign
Clark
Greene
Clinton
Warren
Butler
Fulton
Henry
Putnam
Allen
Auglaize
Shelby
Miami
Montgomery
Preble
Williams
Defiance
Paulding
Van Wert
Mercer
Darke
©2021 CALMER

Exhibit B

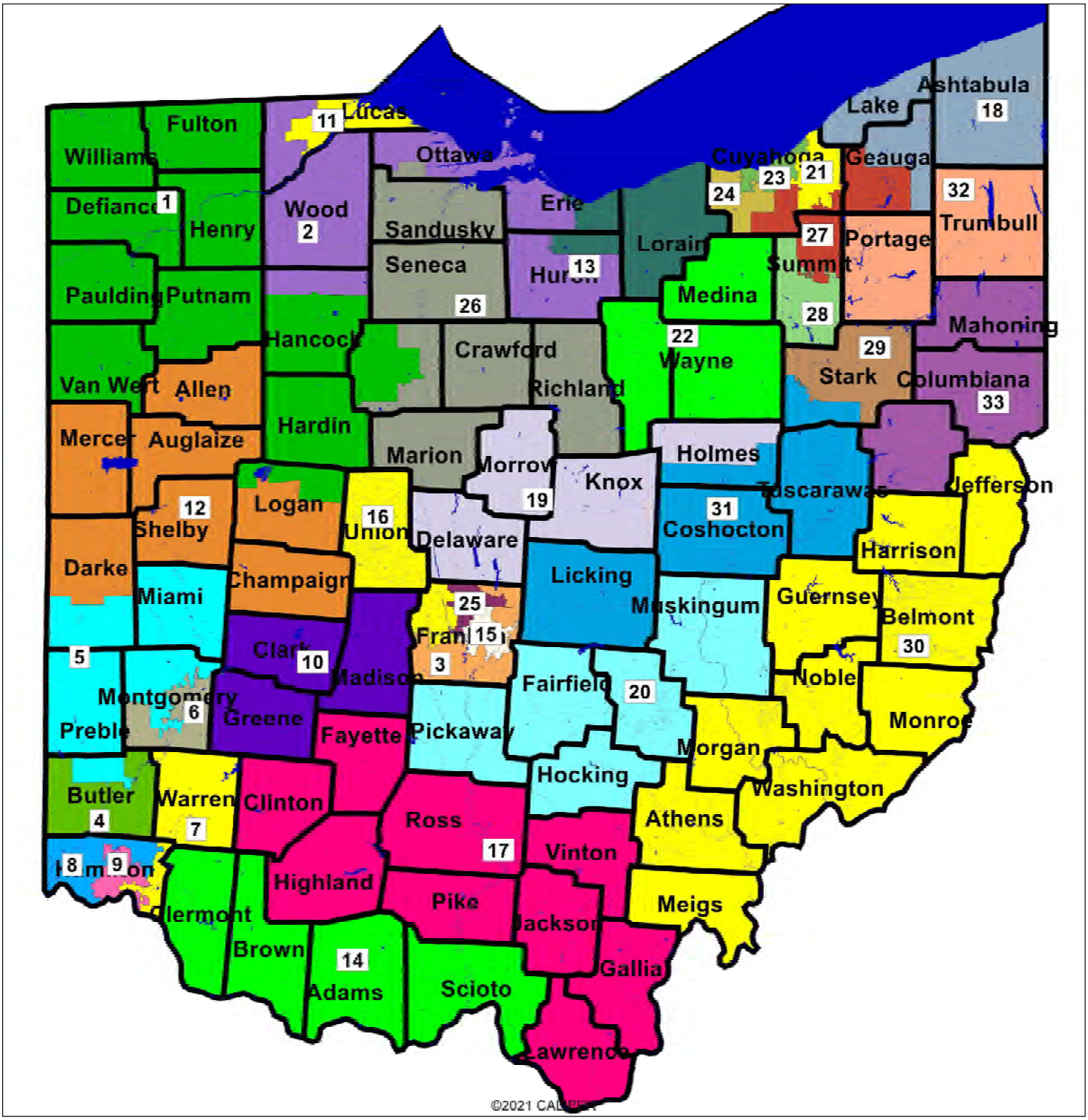

Fulton
Williams
Lucas
11
Ottawa
Ashtabula
18
Lake
Defiance
1
Henry
Wood
2
Sandusky
Erie
Cuyahoga
23
21
24
Geauga
32
Trumbull
Seneca
Lorain
27
Portage
Summit
Paulding
Putnam
26
13
Medina
28
Mahoning
Hancock
Crawford
22
Wayne
29
Stark
Columbiana
Van Wert
Allen
Richland
33
Hardin
Mercer
Auglaize
Marion
Morrow
Holmes
Knox
Jefferson
Logan
19
Tuscarawas
12
16
31
Shelby
Union
Delaware
Coshocton
Harrison
Darke
Champaign
Licking
Miami
25
Muskingum
Guernsey
Belmont
Franklin
15
5
Clark
10
3
30
Madison
Fairfield
20
Noble
Montgomery
6
Greene
Monroe
Preble
Fayette
Pickaway
Morgan
Hocking
Butler
Warren
Clinton
Ross
Washington
4
7
Athens
17
Vinton
8
9
Highland
Pike
Meigs
Clermont
Jackson
Brown
14
Gallia
Adams
Scioto
Lawrence
©2021 CAL

Exhibit C

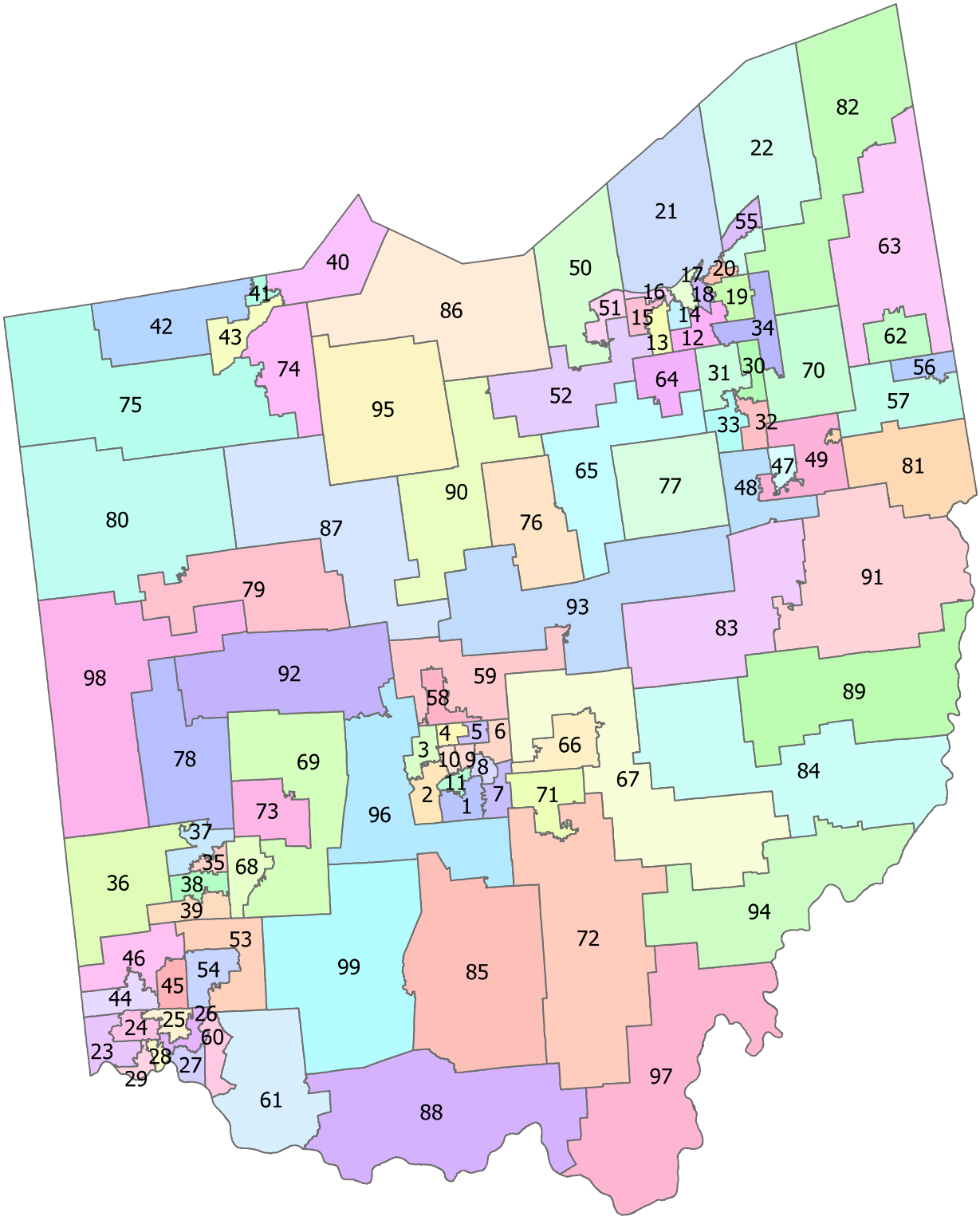

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99

Exhibit D

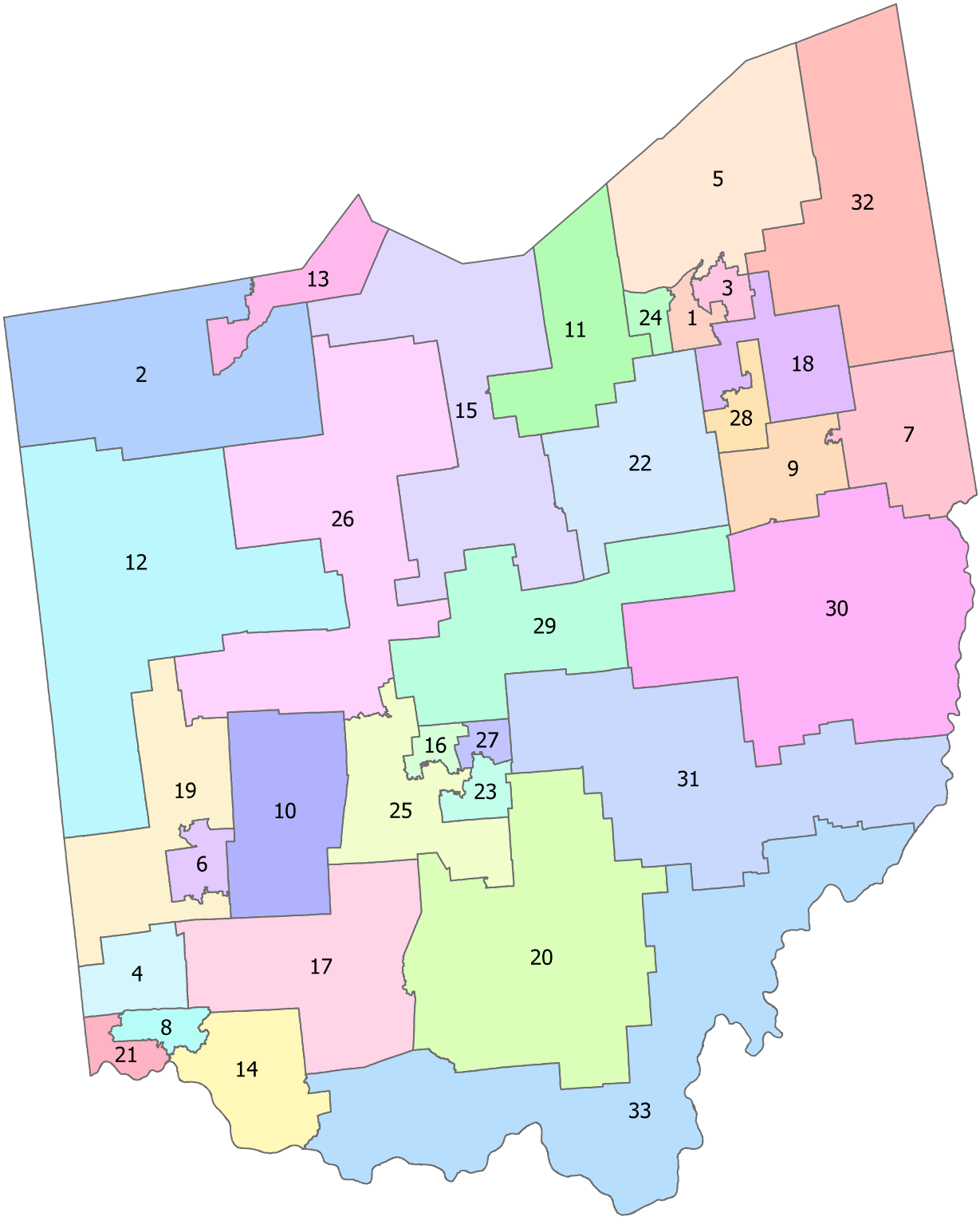

5
32
13
3
11
24
1
2
18
15
28
7
22
9
26
12
30
29
16
27
31
19
10
25
23
6
20
4
17
8
21
14
33

Exhibit E

Jonathan Rodden

Stanford University
Department of Political Science
Encina Hall Central
616 Serra Street
Stanford, CA 94305

Phone: (650) 723-5219
Email: jrodden@stanford.edu
Homepage: http://www.jonathanrodden.com

Personal

Born on August 18. 1971, St. Louis, MO.

United States Citizen.

Education

Ph.D. Political Science, Yale University, 2000.

Fulbright Scholar, University of Leipzig, Germany, 1993–1994.

B.A., Political Science, University of Michigan, 1993.

Academic Positions

Professor, Department of Political Science, Stanford University, 2012–present.

Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

Associate Professor, Department of Political Science, Stanford University, 2007–2012.

Fellow, Center for Advanced Study in the Behavioral Sciences, Palo Alto, CA, 2006–2007.

Ford Career Development Associate Professor of Political Science, MIT, 2003–2006.

Visiting Scholar, Center for Basic Research in the Social Sciences, Harvard University, 2004.

Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

Publications

Books

Why Cities Lose: The Deep Roots of the Urban-Rural Divide. Basic Books, 2019.

Decentralized Governance and Accountability: Academic Research and the Future of Donor Programming. Co-edited with Erik Wibbels, Cambridge University Press, 2019.

Hamilton's Paradox: The Promise and Peril of Fiscal Federalism, Cambridge University Press, 2006. Winner, Gregory Luebbert Award for Best Book in Comparative Politics, 2007; Martha Derthick Award for lasting contribution to the study of federalism, 2021.

Fiscal Decentralization and the Challenge of Hard Budget Constraints, MIT Press, 2003. Co-edited with Gunnar Eskeland and Jennie Litvack.

Peer Reviewed Journal Articles

Who Registers? Village Networks, Household Dynamics, and Voter Registration in Rural Uganda, 2021, *Comparative Political Studies* forthcoming (with Romain Ferrali, Guy Grossman, and Melina Platas).

Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering, 2021, *Political Analysis* forthcoming (with Daryl DeFord Nick Eubank).

Who is my Neighbor? The Spatial Efficiency of Partisanship, 2020, *Statistics and Public Policy* 7(1):87-100 (with Nick Eubank).

Handgun Ownership and Suicide in California, 2020, *New England Journal of Medicine* 382:2220-2229 (with David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller).

Viral Voting: Social Networks and Political Participation, 2020, *Quarterly Journal of Political Science* (with Nick Eubank, Guy Grossman, and Melina Platas).

It Takes a Village: Peer Effects and Externalities in Technology Adoption, 2020, *American Journal of Political Science* (with Romain Ferrali, Guy Grossman, and Melina Platas). Winner, 2020 Best Conference Paper Award, American Political Science Association Network Section.

Assembly of the LongSHOT Cohort: Public Record Linkage on a Grand Scale, 2019, *Injury Prevention* (with Yifan Zhang, Erin Holsinger, Lea Prince, Sonja Swanson, Matthew Miller, Garen Wintemute, and David Studdert).

Crowdsourcing Accountability: ICT for Service Delivery, 2018, *World Development* 112: 74-87 (with Guy Grossman and Melina Platas).

Geography, Uncertainty, and Polarization, 2018, *Political Science Research and Methods* doi:10.1017/psrm.2018.12 (with Nolan McCarty, Boris Shor, Chris Tausanovitch, and Chris Warshaw).

Handgun Acquisitions in California after Two Mass Shootings, 2017, *Annals of Internal Medicine* 166(10):698-706. (with David Studdert, Yifan Zhang, Rob Hyndman, and Garen Wintemute).

Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders, 2015, *Election Law Journal* 14,4:1-15 (with Jowei Chen).

The Achilles Heel of Plurality Systems: Geography and Representation in Multi-Party Democracies, 2015, *American Journal of Political Science* 59,4: 789-805 (with Ernesto Calvo). Winner, Michael Wallerstein Award for best paper in political economy, American Political Science Association.

Why has U.S. Policy Uncertainty Risen Since 1960?, 2014, *American Economic Review: Papers and Proceedings* May 2014 (with Nicholas Bloom, Brandice Canes-Wrone, Scott Baker, and Steven Davis).

Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, 2013, *Quarterly Journal of Political Science* 8: 239-269 (with Jowei Chen).

How Should We Measure District-Level Public Opinion on Individual Issues?, 2012, *Journal of Politics* 74, 1: 203-219 (with Chris Warshaw).

Representation and Redistribution in Federations, 2011, *Proceedings of the National Academy of Sciences* 108, 21:8601-8604 (with Tiberiu Dragu).

Dual Accountability and the Nationalization of Party Competition: Evidence from Four Federatons, 2011, *Party Politics* 17, 5: 629-653 (with Erik Wibbels).

The Geographic Distribution of Political Preferences, 2010, *Annual Review of Political Science* 13: 297–340.

Fiscal Decentralization and the Business Cycle: An Empirical Study of Seven Federations, 2009, *Economics and Politics* 22,1: 37–67 (with Erik Wibbels).

Getting into the Game: Legislative Bargaining, Distributive Politics, and EU Enlargement, 2009, *Public Finance and Management* 9, 4 (with Deniz Aksoy).

The Strength of Issues: Using Multiple Measures to Gauge Preference Stability, Ideological Constraint, and Issue Voting, 2008. *American Political Science Review* 102, 2: 215–232 (with Stephen Ansolabehere and James Snyder).

Does Religion Distract the Poor? Income and Issue Voting Around the World, 2008, *Comparative Political Studies* 41, 4: 437–476 (with Ana Lorena De La O).

Purple America, 2006, *Journal of Economic Perspectives* 20,2 (Spring): 97–118 (with Stephen Ansolabehere and James Snyder).

Economic Geography and Economic Voting: Evidence from the U.S. States, 2006, *British Journal of Political Science* 36, 3: 527–47 (with Michael Ebeid).

Distributive Politics in a Federation: Electoral Strategies, Legislative Bargaining, and Government Coalitions, 2004, *Dados* 47, 3 (with Marta Arretche, in Portuguese).

Comparative Federalism and Decentralization: On Meaning and Measurement, 2004, *Comparative Politics* 36, 4: 481-500. (Portuguese version, 2005, in *Revista de Sociologia e Politica* 25).

Reviving Leviathan: Fiscal Federalism and the Growth of Government, 2003, *International Organization* 57 (Fall), 695–729.

Beyond the Fiction of Federalism: Macroeconomic Management in Multi-tiered Systems, 2003, *World Politics* 54, 4 (July): 494–531 (with Erik Wibbels).

The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World, 2002, *American Journal of Political Science* 46(3): 670–687.

Strength in Numbers: Representation and Redistribution in the European Union, 2002, *European Union Politics* 3, 2: 151–175.

Does Federalism Preserve Markets? *Virginia Law Review* 83, 7 (with Susan Rose-Ackerman). Spanish version, 1999, in *Quorum* 68.

Working Papers

Elections, Political Polarization, and Economic Uncertainty, NBER Working Paper 27961 (with Scott Baker, Aniket Baksy, Nicholas Bloom, and Steven Davis).

Federalism and Inter-regional Redistribution, Working Paper 2009/3, Institut d'Economia de Barcelona.

Representation and Regional Redistribution in Federations, Working Paper 2010/16, Institut d'Economia de Barcelona (with Tiberiu Dragu).

Chapters in Books

Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), in *Political Geometry*, edited by Moon Duchin and Olivia Walch, forthcoming 2021, Springer.

Keeping Your Enemies Close: Electoral Rules and Partisan Polarization, in *The New Politics of Insecurity*, edited by Frances Rosenbluth and Margaret Weir, forthcoming 2021, Cambridge University Press.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

The Political Economy of Federalism, 2006, in Barry Weingast and Donald Wittman, eds., *Oxford Handbook of Political Economy*, Oxford University Press.

Fiscal Discipline in Federations: Germany and the EMU, 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Online Interactive Visualization

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

Other Publications

Supporting Advanced Manufacturing in Alabama, Report to the Alabama Innovation Commission, Hoover Institution, 2021.

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

On the Migration of Fiscal Sovereignty, 2004, *PS: Political Science and Politics* July, 2004: 427–431.

Decentralization and the Challenge of Hard Budget Constraints, *PREM Note* 41, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies 32,7: 897-900.*

Fellowships, Honors, and Grants

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy

Introduction to Comparative Politics

Introduction to Political Science

Political Science Scope and Methods

Institutional Economics

Spatial Approaches to Social Science

Graduate

Political Economy

Political Economy of Institutions

Federalism and Fiscal Decentralization

Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Curcuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006–2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008–2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998–2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: September 23, 2021

Exhibit F

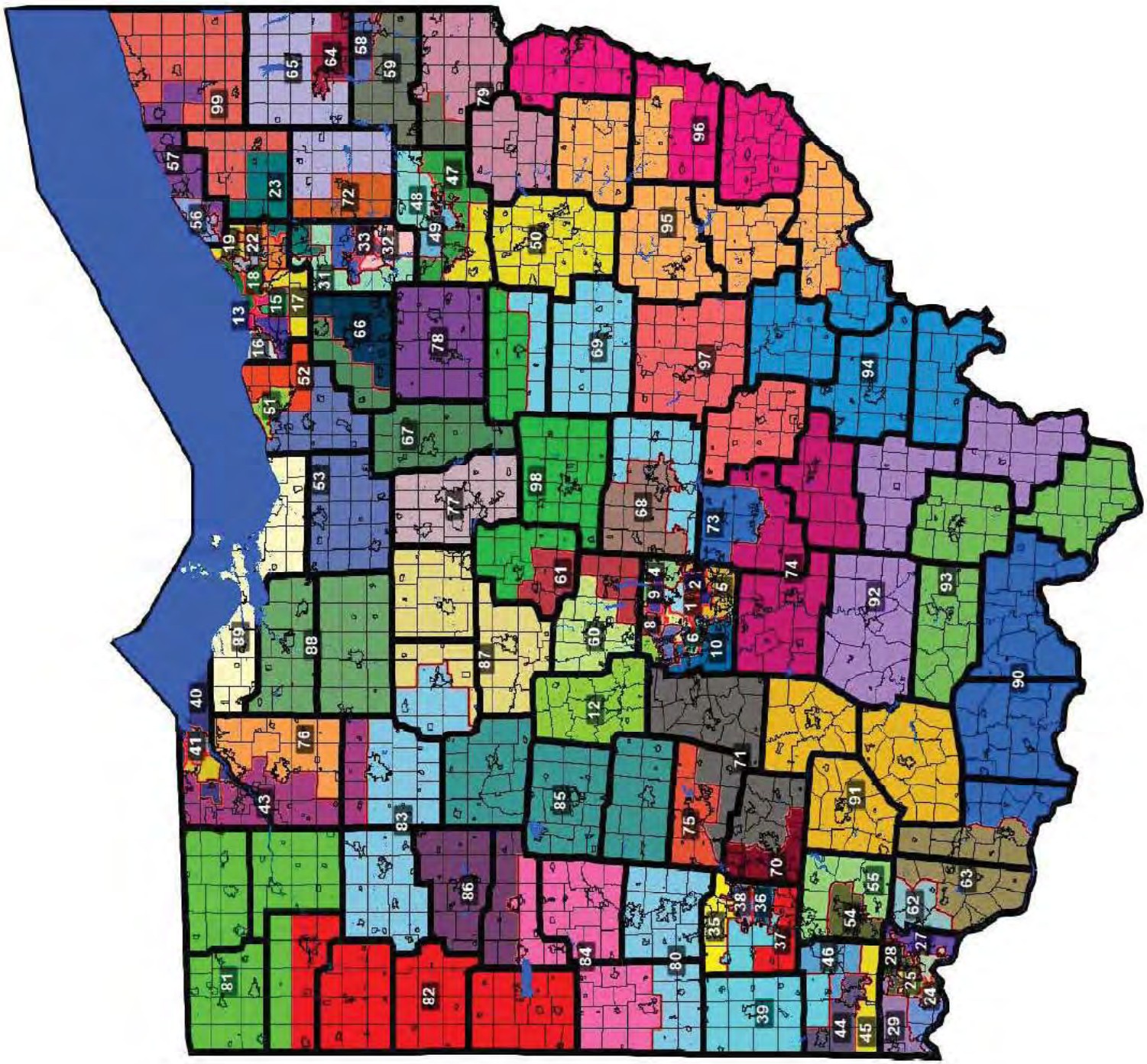

©2021 CALFER

Exhibit G

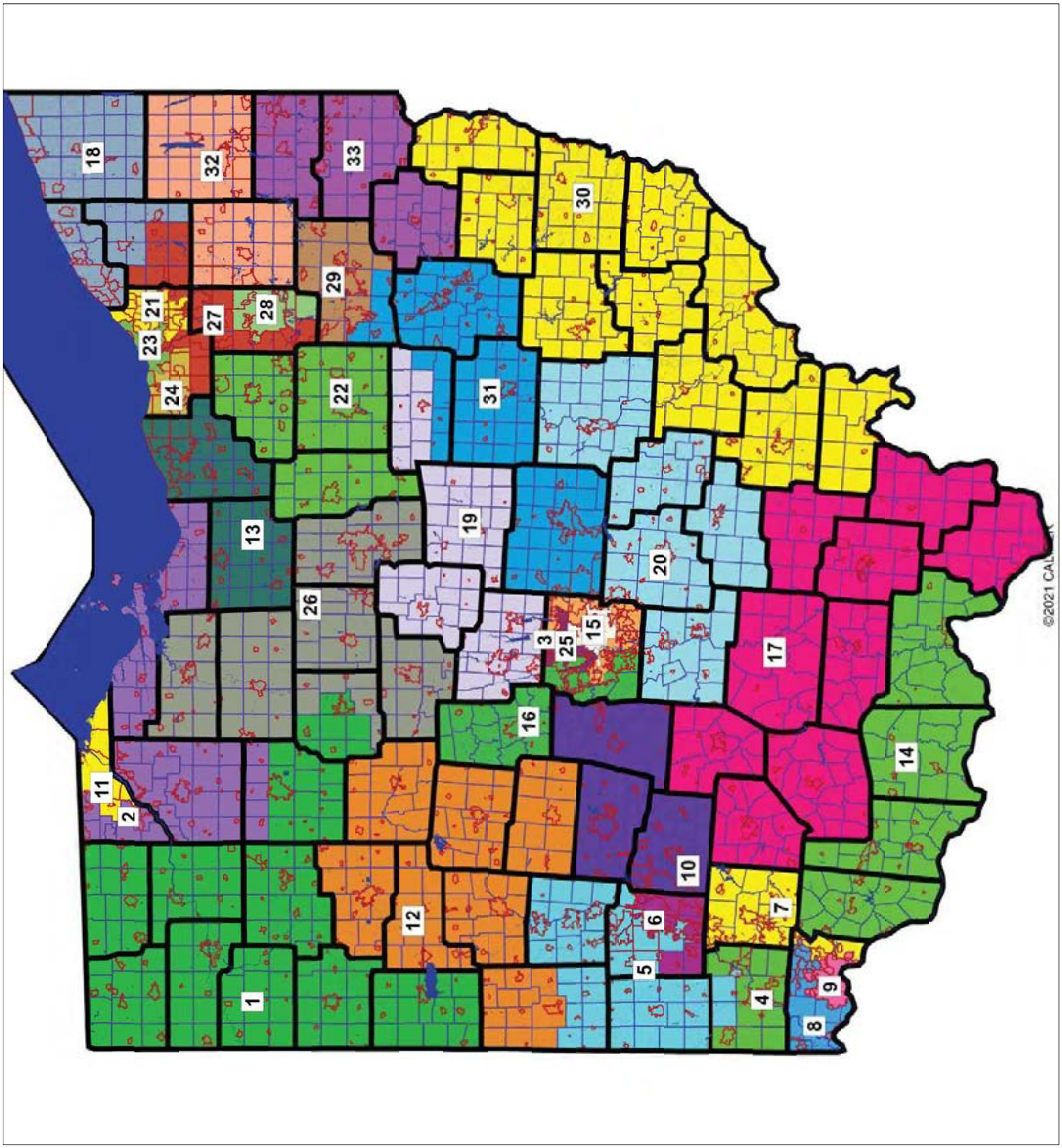

18
32
33
30
29
21
23
27
28
24
22
31
13
19
20
26
3
25
15
17
16
14
11
2
10
12
6
7
5
4
9
8
1
©2021 CAL

Exhibit H

Article XI, Section 8(C)(2) Statement

Pursuant to Article XI, Section 8(C)(2) of the Ohio Constitution, the Ohio Redistricting Commission issues the following statement:

The Commission determined that the statewide preferences of the voters of Ohio predominately favor Republican candidates.

The Commission considered statewide state and federal partisan general election results during the last ten years. There were sixteen such contests. When considering the results of each of those elections, the Commission determined that Republican candidates won thirteen out of sixteen of those elections resulting in a statewide proportion of voters favoring statewide Republican candidates of 81% and a statewide proportion of voters favoring statewide Democratic candidates of 19%. When considering the number of votes cast in each of those elections for Republican and Democratic candidates, the statewide proportion of voters favoring statewide Republican candidates is 54% and the statewide proportion of voters favoring statewide Democratic candidates is 46%. Thus, the statewide proportion of voters favoring statewide Republican candidates is between 54% and 81% and the statewide proportion of voters favoring statewide Democratic candidates is between 19% and 46%. The Commission obtained publicly available geographic data for statewide partisan elections in 2016, 2018, and 2020. Publicly available geographic data for those elections was not available for elections in 2012 and 2014. Using this data, the Commission adopted the final general assembly district plan, which contains 85 districts (64.4%) favoring Republican candidates and 47 districts (35.6%) favoring Democratic candidates out of a total of 132 districts. Accordingly, the statewide proportion of districts whose voters favor each political party corresponds closely to the statewide preferences of the voters of Ohio.

The final general assembly district plan adopted by the Commission complies with all of the mandatory requirements of Article XI, Sections 2, 3, 4, 5, and 7 of the Ohio Constitution. The Commission's attempt to meet the aspirational standards of Article XI, Section 6 of the Ohio Constitution did not result in any violation of the mandatory requirements of Article XI, Sections 2, 3 ,4, 5, and 7 of the Ohio Constitution.

CERTIFICATE OF SERVICE

I hereby certify that the foregoing was sent via email this 25th day of January, 2022 to the following:

DAVE YOST
OHIO ATTORNEY GENERAL
Bridget C. Coontz (0072919)
Julie M. Pfeiffer (0069762)
30 E. Broad Street
Columbus, OH 43215
Tel: (614) 466-2872
Fax: (614) 728-7592
bridget.coontz@ohioago.gov
julie.pfeiffer@ohioago.gov

Counsel for Respondents
Governor Mike DeWine,
Secretary of State Frank LaRose, and
Auditor Keith Faber

W. Stuart Dornette (0002955)
Beth A. Bryan (0082076)
Philip D. Williamson (0097174)
TAFT STETTINIUS & HOLLISTER LLP
425 Walnut St., Suite 1800
Cincinnati, Ohio 45202-3957
T: (513) 381-2838
dornette@taftlaw.com
bryan@taftlaw.com
pwilliamson@taftlaw.com

Phillip J. Strach (PHV 25444-2021)
Thomas A. Farr (PHV 25461-2021)
John E. Branch, III (PHV 25460-2021)
Alyssa M. Riggins (PHV 25441-2021)
NELSON MULLINS RILEY & SCARBOROUGH LLP
4140 Parklake Ave., Suite 200
Raleigh, North Carolina 27612
phil.strach@nelsonmullins.com
tom.farr@nelsonmullins.com
john.branch@nelsonmullins.com
alyssa.riggins@nelsonmullins.com
T: (919) 329-3812

Counsel for Respondents
Senate President Matt Huffman and
House Speaker Robert Cupp

John Gilligan (Ohio Bar No. 0024542)
Diane Menashe (Ohio Bar No. 0070305)
ICE MILLER LLP
250 West Street, Suite 700
Columbus, Ohio 43215
John.Gilligan@icemiller.com Diane.Menashe@icemiller.com

Counsel for Respondents
Senator Vernon Sykes and
House Minority Leader-Elect Allison Russo

Erik J. Clark (Ohio Bar No. 0078732)
Ashley Merino (Ohio Bar No. 0096853)
ORGAN LAW LLP
1330 Dublin Road
Columbus, Ohio 43215
T: (614) 481-0900
F: (614) 481-0904
ejclark@organlegal.com
amerino@organlegal.com

Counsel for Respondent
Ohio Redistricting Commission

/s/ Derek S. Clinger
Derek S. Clinger (0092075)